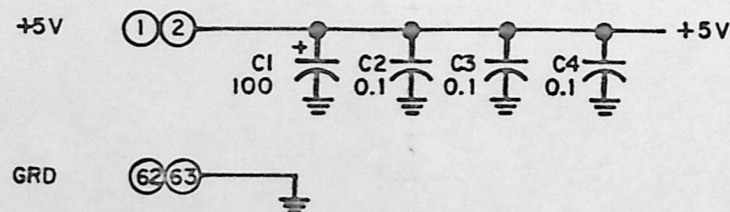
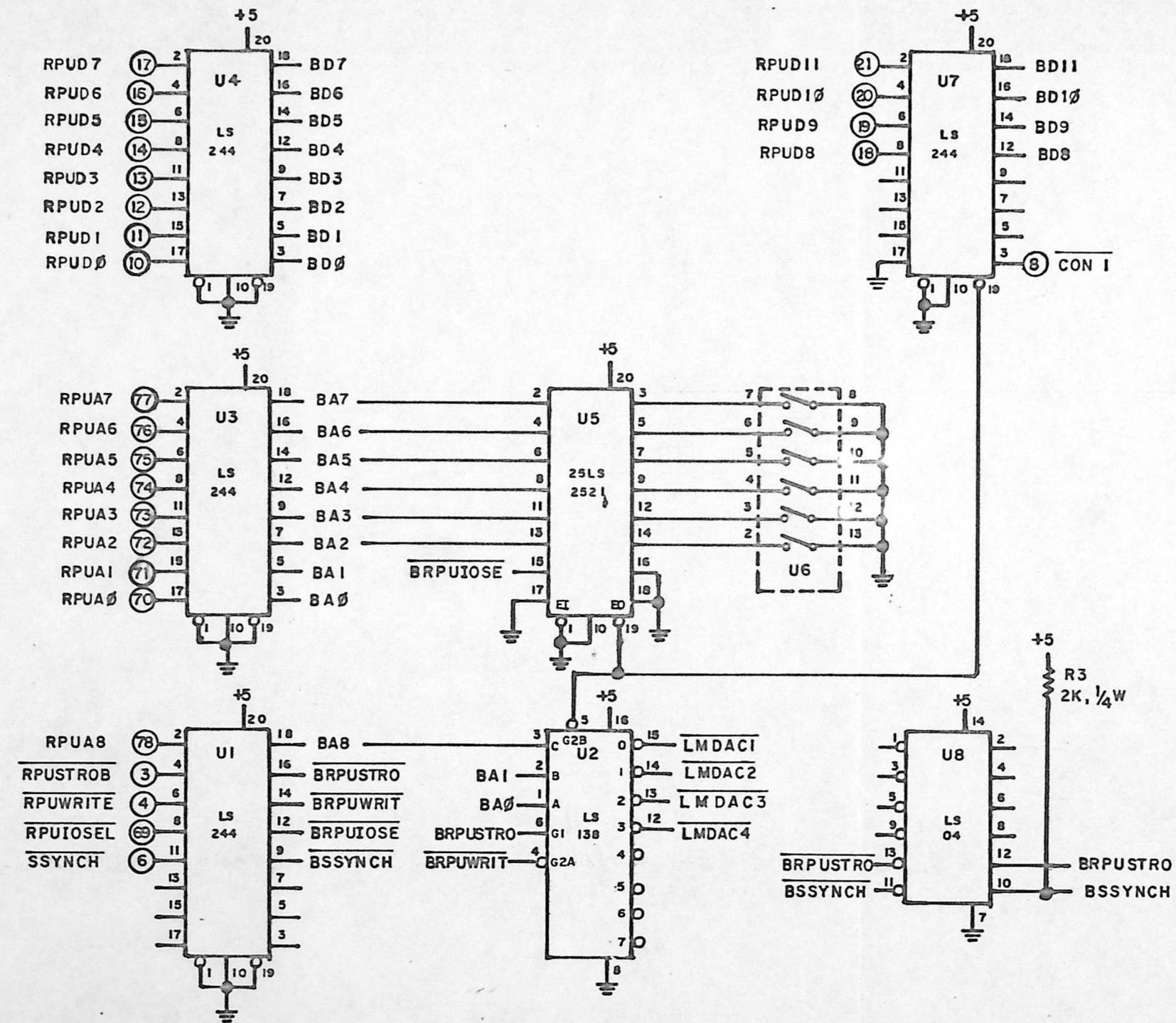
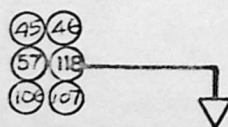
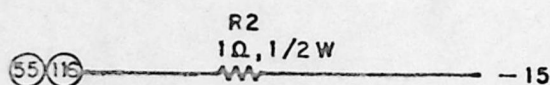
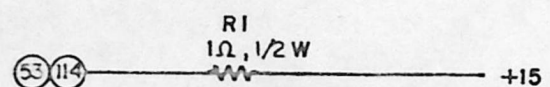
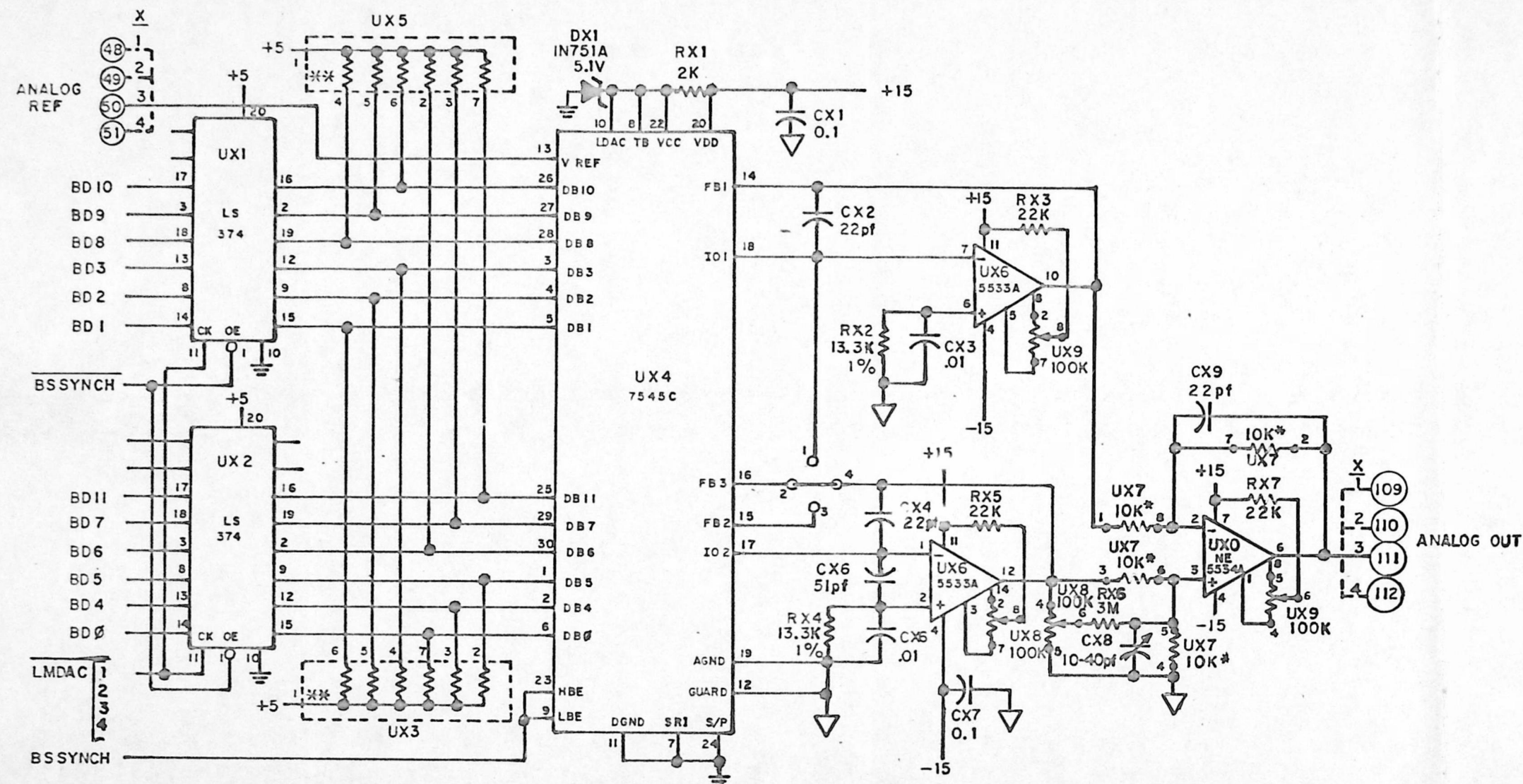


SYSTEM NUMBER: 026-3 MEXICO

[illegible]

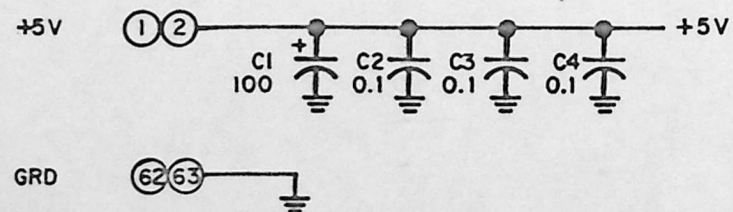
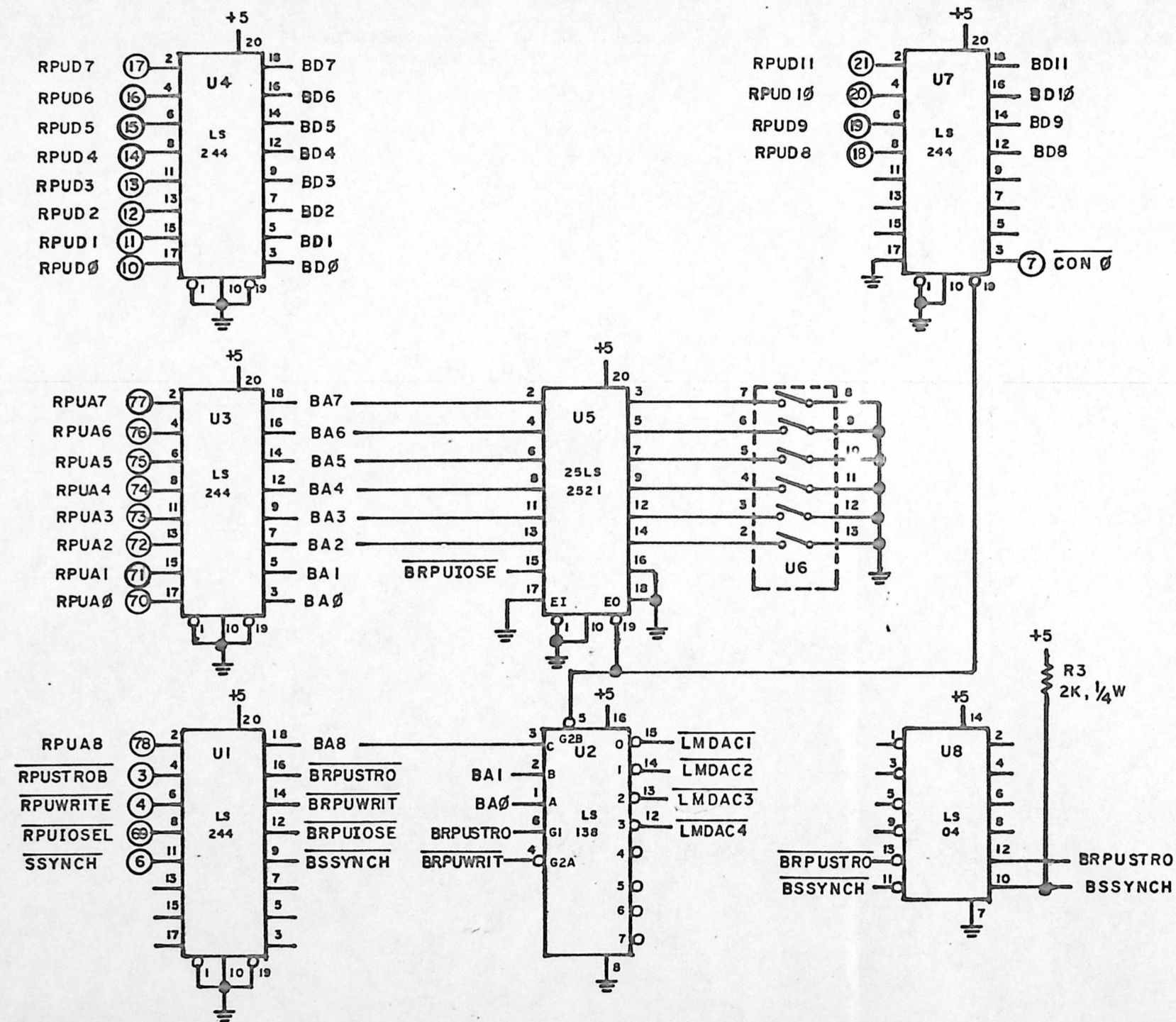


COMPUTER IMAGE CORPORATION 2475 W. 2nd AVE DENVER, CO. 80223			
SCALE NONE	REVISIONS	BY E.R.	DATE 3-10
DATE 9-14-81	PER W.C.A. PRINT		
DRW E.R.	CKD		
APVD			
TITLE DIGITAL CONTROL FOR FOUR 12 BIT M DAC's	NO CIC-1-1 SHEET 1 OF 2		

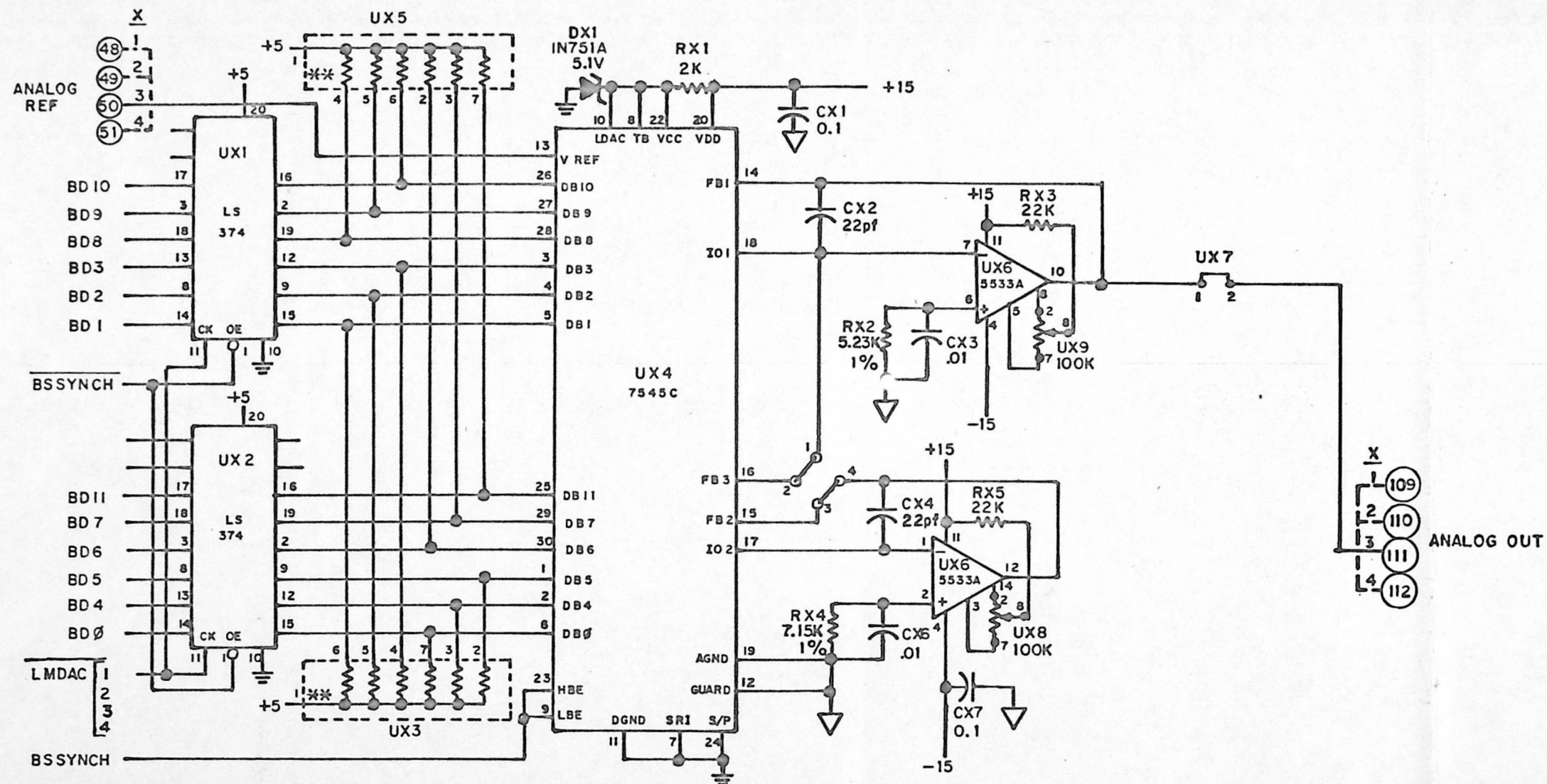


UNLESS OTHERWISE SPECIFIED
 ALL RESISTORS ARE 1/4W, 5%
 ALL CAPACITORS ARE IN MFD's
 ▽ DENOTES ANALOG GROUND
 * DENOTES BECKMAN 694-3-RIOKD
 4 RESISTOR NETWORK
 ** 9 RESISTOR NETWORK, 2.0K EACH

COMPUTER IMAGE CORPORATION 2475 W. 2nd AVE DENVER, CO. 80223				
SCALE	NONE	REVISIONS	BY	DATE
DATE	9-14-81	PER WCA PRINT	ER	3-10
DRW	E.R.	CRD		
APVD				
TITLE			NO	
12 BIT MDAC's (ONE OF FOUR PER BOARD)			CIC-1-1 SHEET 2 OF 2	



COMPUTER IMAGE CORPORATION 2475 W. 2nd AVE DENVER, CO. 80223			
SCALE NONE	REVISIONS	BY	DATE
DATE 9-14-81	PER WCA PRINT	E.R.	3-10
DRN E.R.	CRD		
APVD			
TITLE DIGITAL CONTROL FOR FOUR 12 BIT M DAC's	NO CIC-1-2 SHEET 1 OF 2		



R1
1Ω, 1/2 W
53 114

R2
1Ω, 1/2 W
55 115

45 46
57 116
109 107

UNLESS OTHERWISE SPECIFIED

ALL RESISTORS ARE 1/4 W, 5%

ALL CAPACITORS ARE IN MFD'S

▽ DENOTES ANALOG GROUND

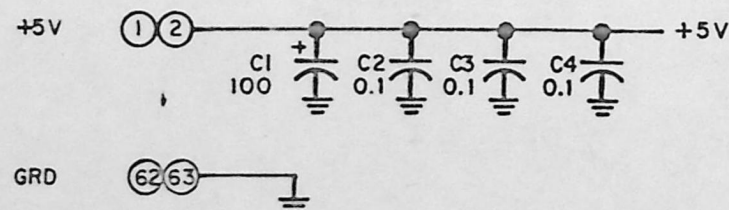
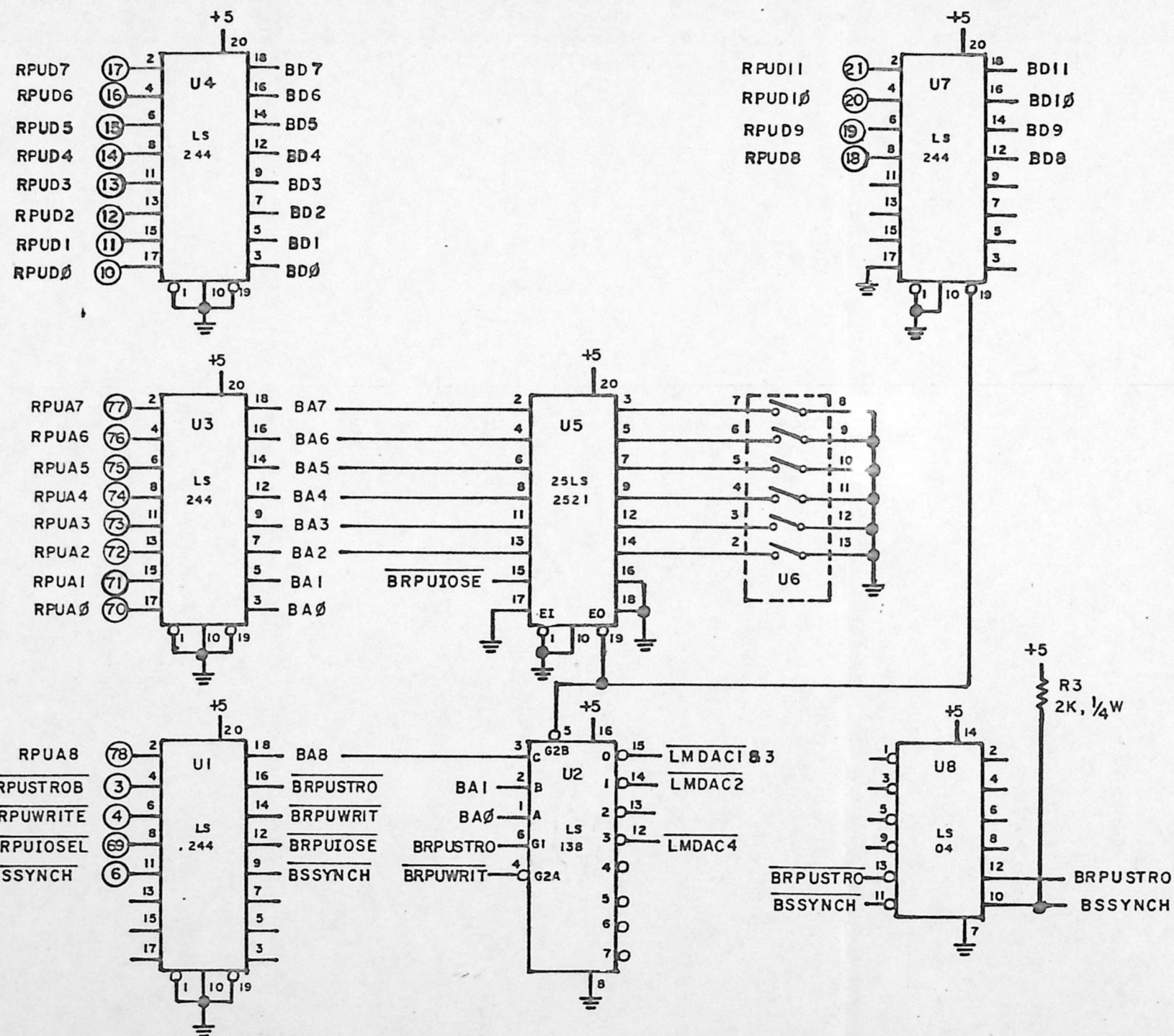
* DENOTES BECKMAN 694-3-RIOKD
4 RESISTOR NETWORK

** 9 RESISTOR NETWORK, 2.0K EACH

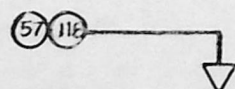
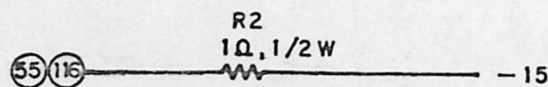
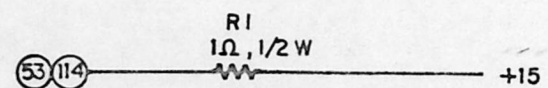
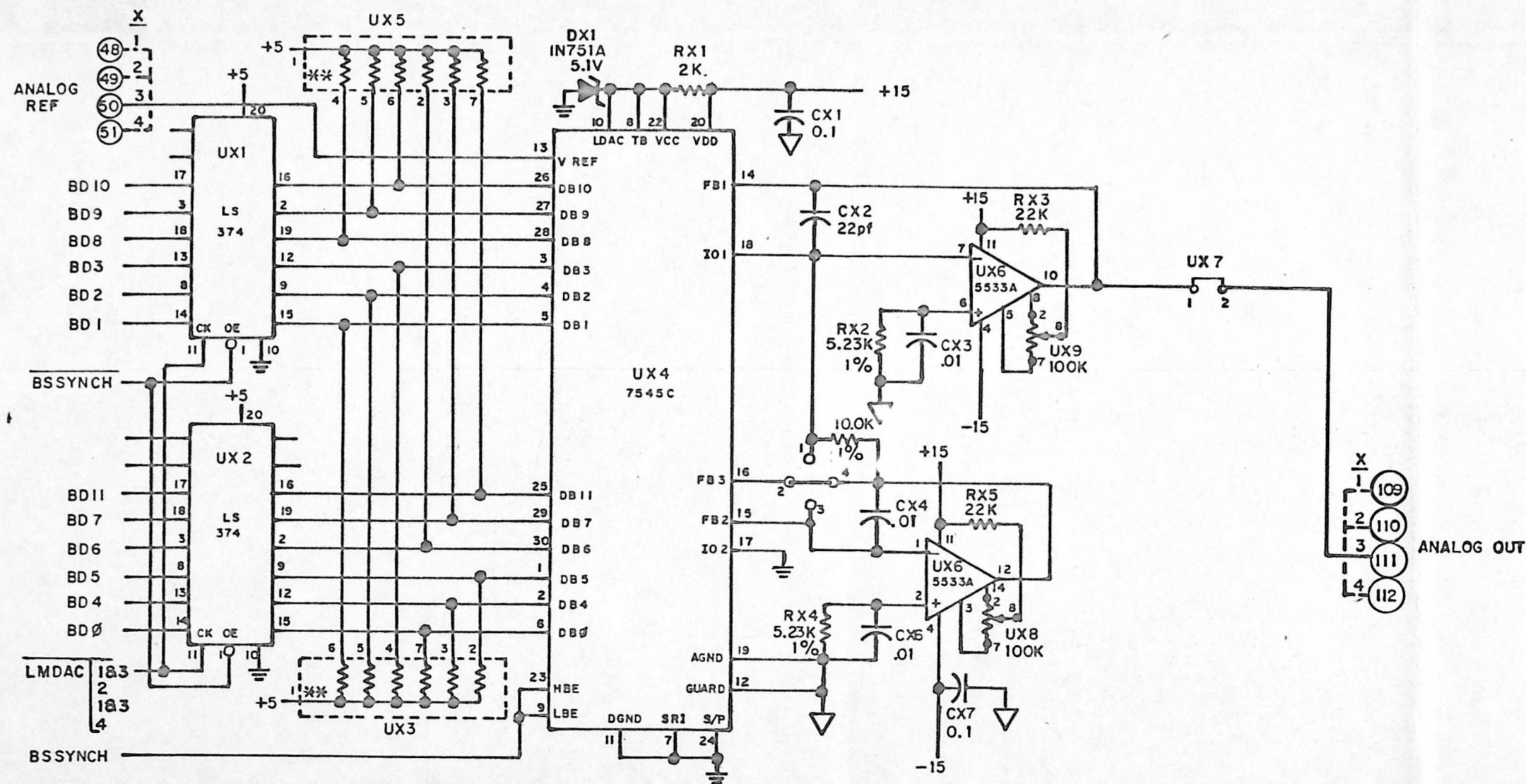
COMPUTER IMAGE CORPORATION
2475 W. 2nd AVE
DENVER, CO. 80223

SCALE	NONE	REVISIONS	BY	DATE
DATE	9-14-81	PER WCA. PRINT	E.R.	3-10
DRN	E.R.	CKD		
APVD				

TITLE	NO
12 BIT MDAC's (ONE OF FOUR PER BOARD)	CIC-1-2 SHEET 2 OF 2



COMPUTER IMAGE CORPORATION 2475 W. 2nd AVE DENVER, CO. 80223			
SCALE NONE	REVISIONS	BY	DATE
DATE 9-14-81	PER W.C.A. PRINT	E.R.	3-10
DRN E.R.	CRD		
APVD			
TITLE DIGITAL CONTROL FOR FOUR 12 BIT MDAC's		NO CIC-1-3 SHEET 1 OF 2	



UNLESS OTHERWISE SPECIFIED

ALL RESISTORS ARE 1/4 W, 5%

ALL CAPACITORS ARE IN MFD's

▽ DENOTES ANALOG GROUND

* DENOTES BECKMAN 694-3-RIOKD
4 RESISTOR NETWORK

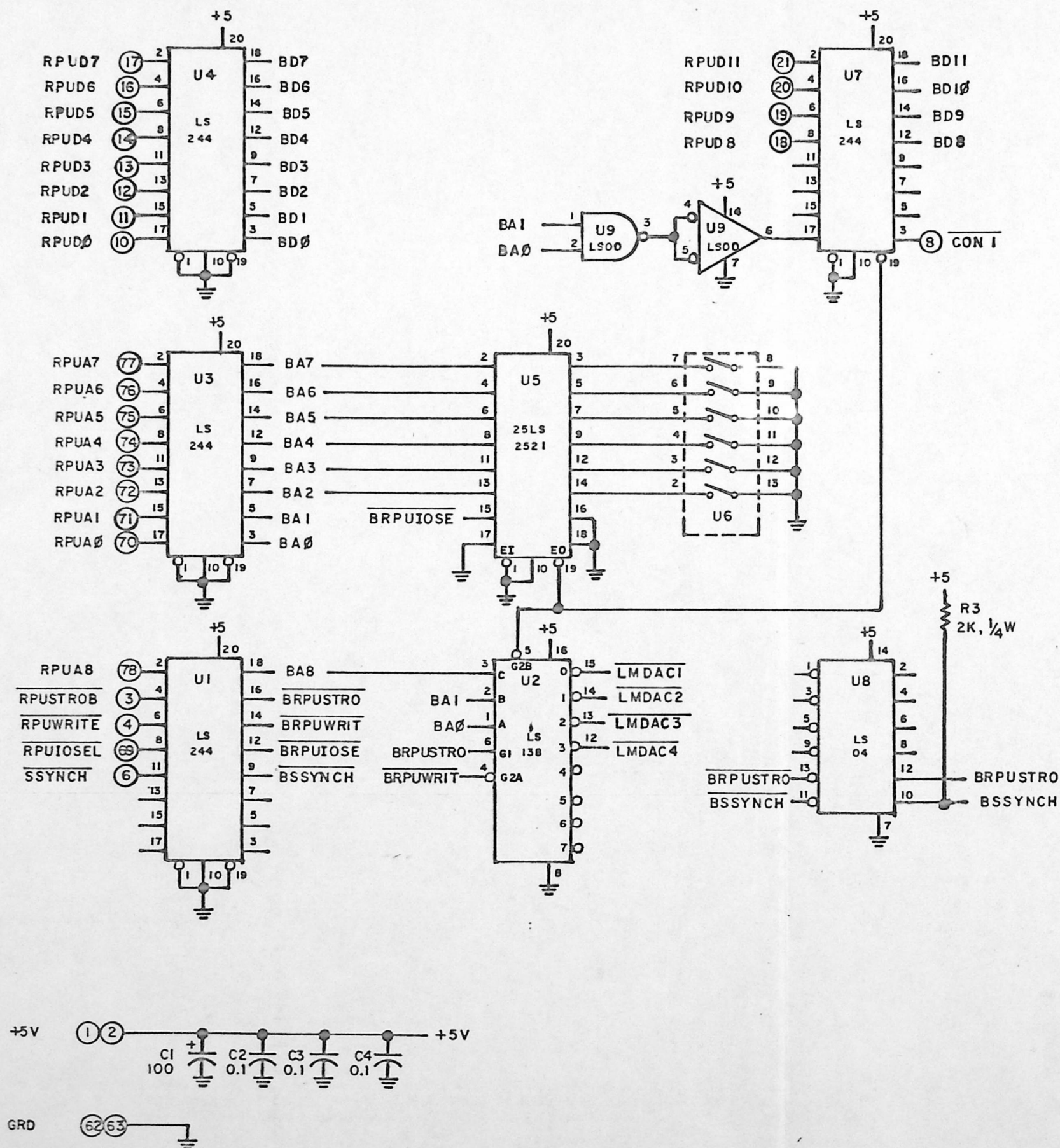
** 9 RESISTOR NETWORK, 2.0K EACH

COMPUTER IMAGE CORPORATION
2475 W. 2nd AVE
DENVER, CO. 80223

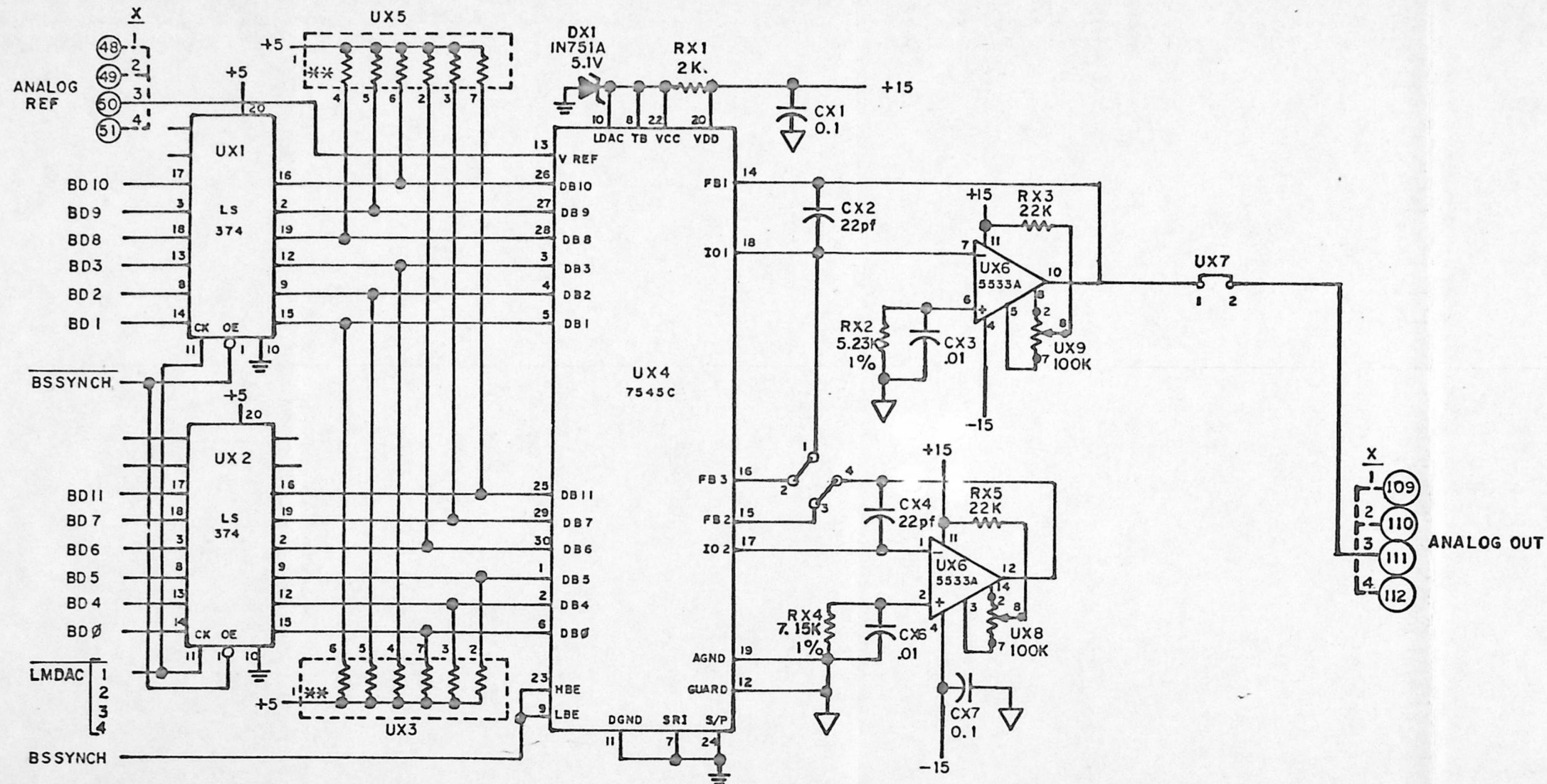
SCALE	NONE	REVISIONS	BY	DATE
DATE	9-14-81	PER WCA. PRINT	E.R.	3-10
DRN	E.R.	CRD		
APVD				

TITLE
12 BIT MDAC's
(ONE OF FOUR PER BOARD)

NO
CIC-1-3
SHEET 2 OF 2



COMPUTER IMAGE CORPORATION				
2475 W. 2nd AVE				
DENVER, CO. 80223				
SCALE	NONE	REVISIONS	BY	DATE
DATE	9-14-81	PER W.C.A. PRINT	E.R.	3-10
DRN	E.R.	CRD		
APVD				
TITLE	DIGITAL CONTROL FOR FOUR 12 BIT M DAC's			NO CIC-1-5 SHEET 1 OF 2



R1
1Ω, 1/2 W
53 114

R2
1Ω, 1/2 W
55 115

57 116

UNLESS OTHERWISE SPECIFIED

ALL RESISTORS ARE 1/4W, 5%

ALL CAPACITORS ARE IN MFD's

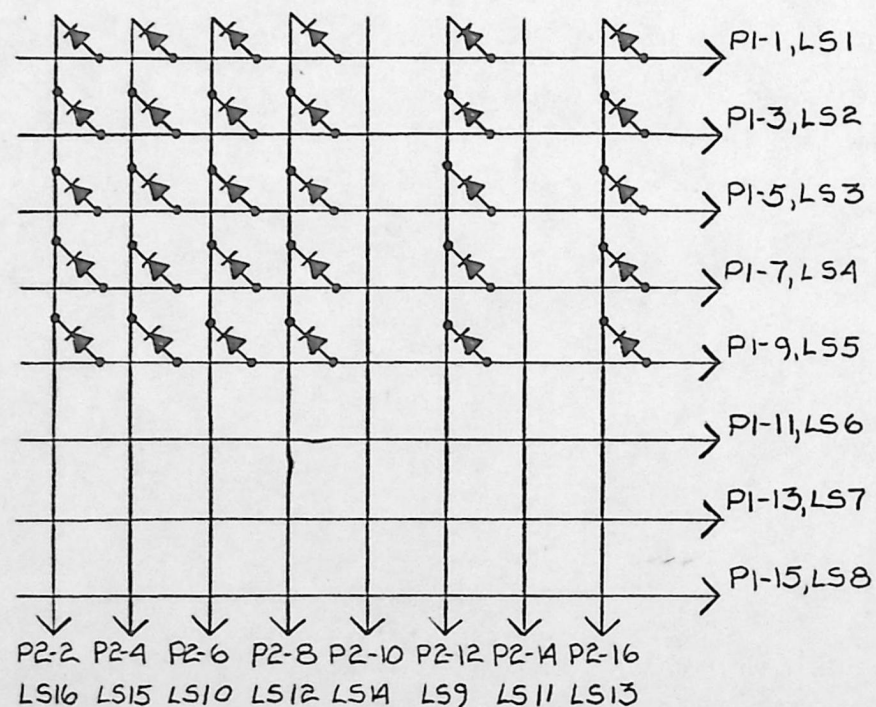
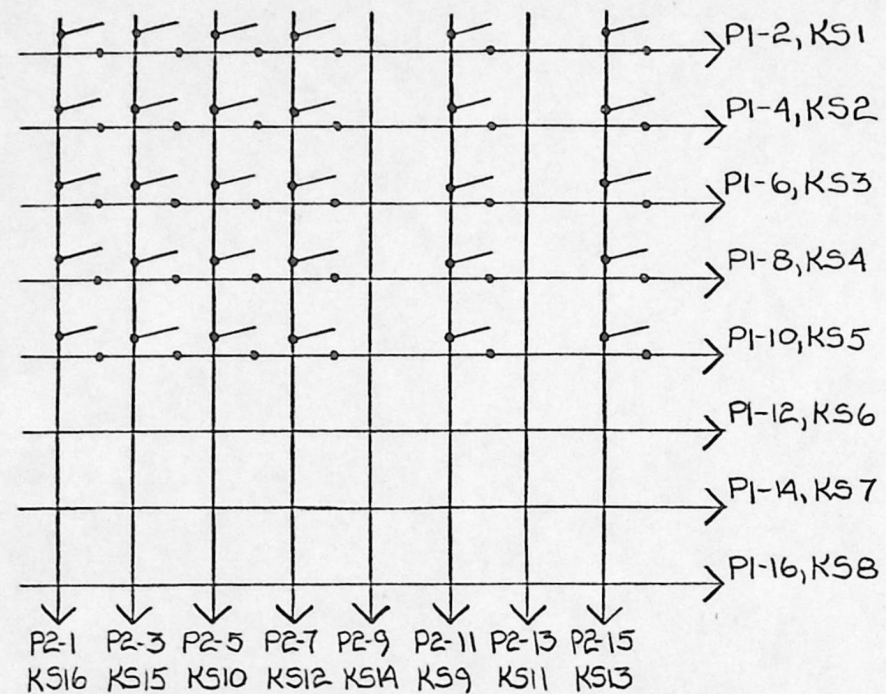
▽ DENOTES ANALOG GROUND

* DENOTES BECKMAN 694-3-RIOKD
4 RESISTOR NETWORK

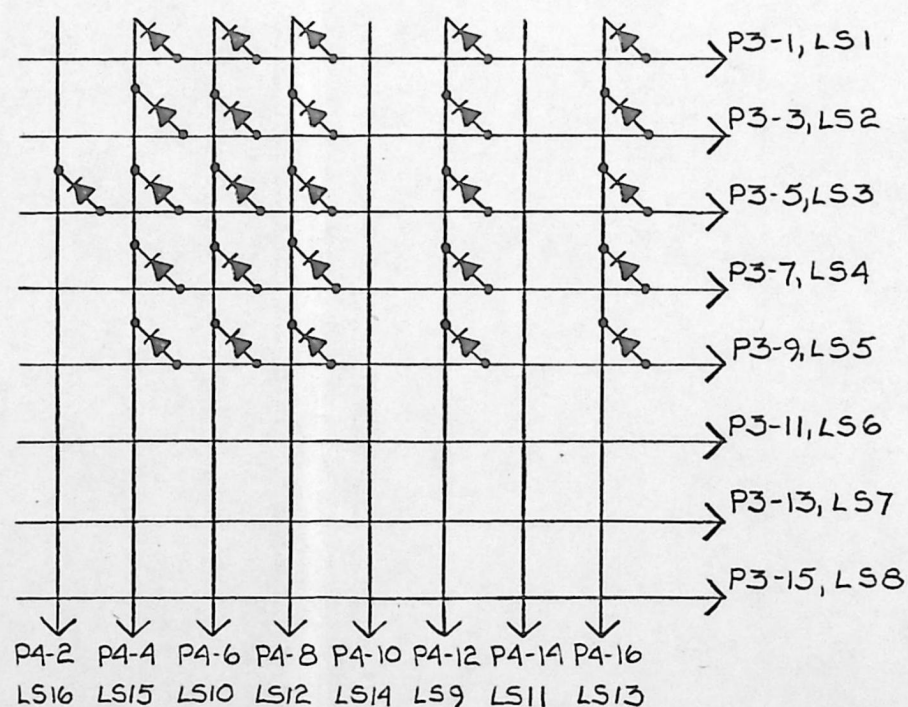
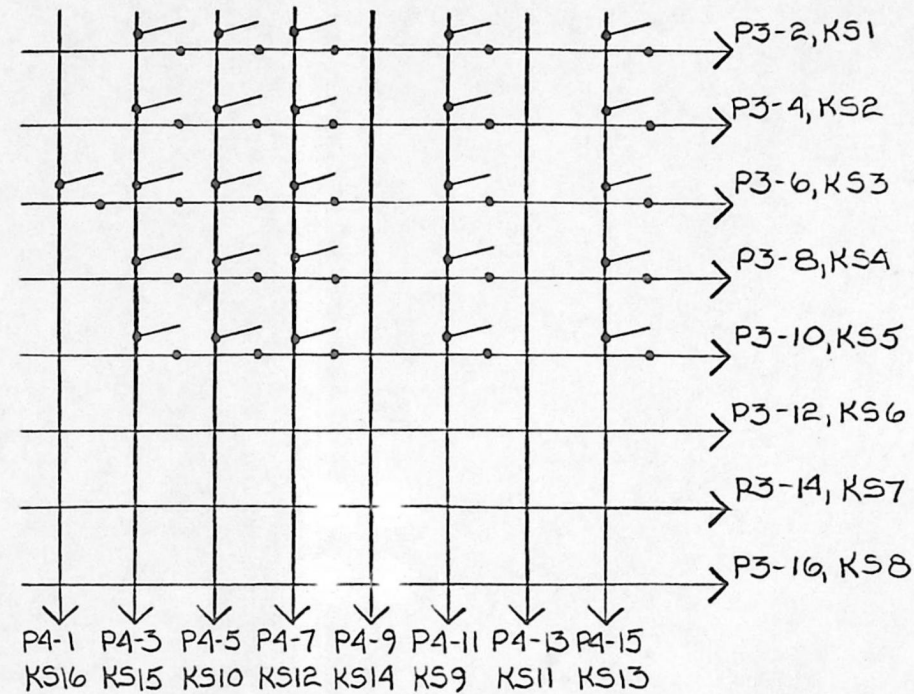
** 9 RESISTOR NETWORK, 2.0K EACH

COMPUTER IMAGE CORPORATION 2475 W. 2nd AVE DENVER, CO. 80223			
SCALE NONE	REVISIONS	BY	DATE
DATE 9-14-81	PER W.C.A. PRINT	E.R.	3-10
DRW E.R.	C.R.D.		
APVD			
TITLE 12 BIT MDAC's (ONE OF FOUR PER BOARD)		CIC-1-5 SHEET 2 OF 2	

MODULE 1 ANIMATE MODE SWITCHES



MODULE 2 CONTROL MODE SWITCHES

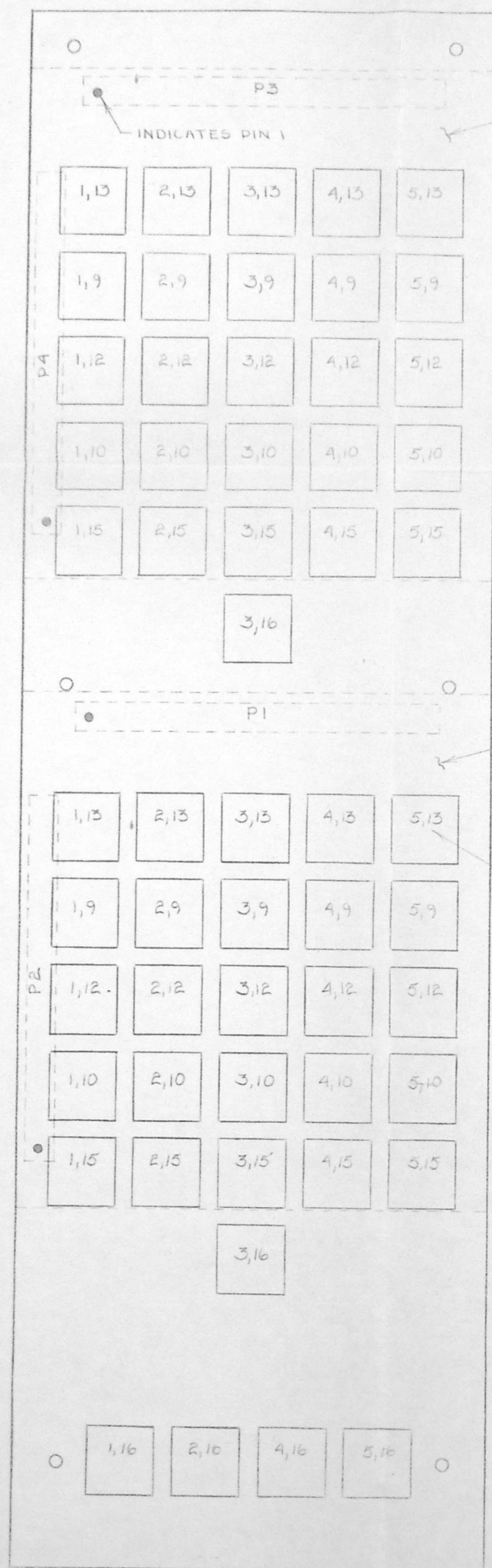


NOTES

- ALL DIODES ARE LED'S
- THE KS AND LS NUMBERS ARE THE MATRIX CODES OF THE CIC-6A MODULE

COMPUTER IMAGE CORP.
DENVER, COLORADO

SCALE	REVISIONS	BY	DATE
DATE 5/26/82			
DR GSH CKD			
APVD			
TITLE			NO
ANIMATE/CONTROL SWITCHES			CIC-2



CIC-6A, MODULE 2
DEVICE SELECT IS 1

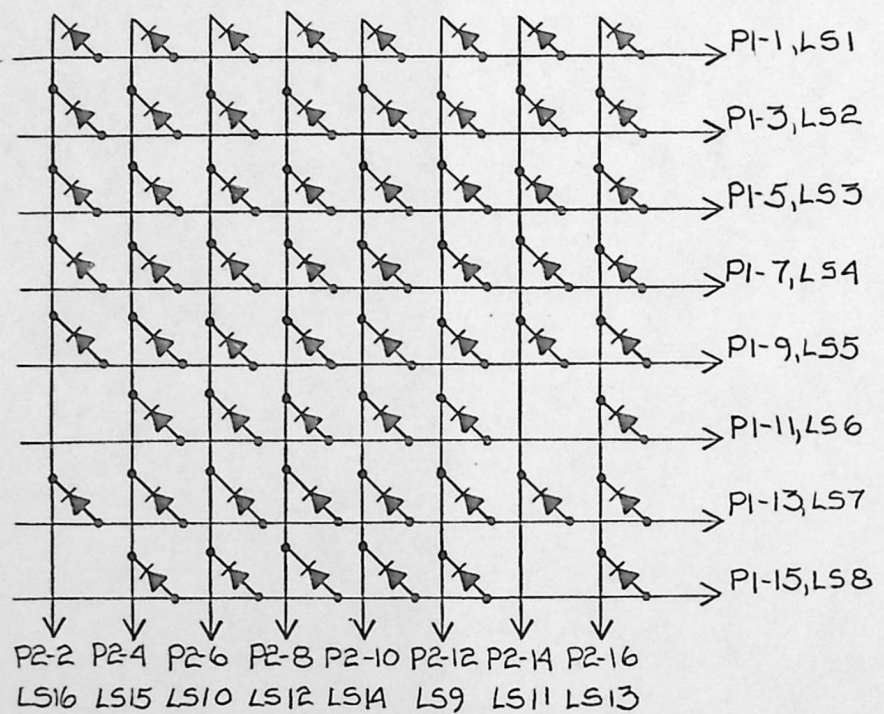
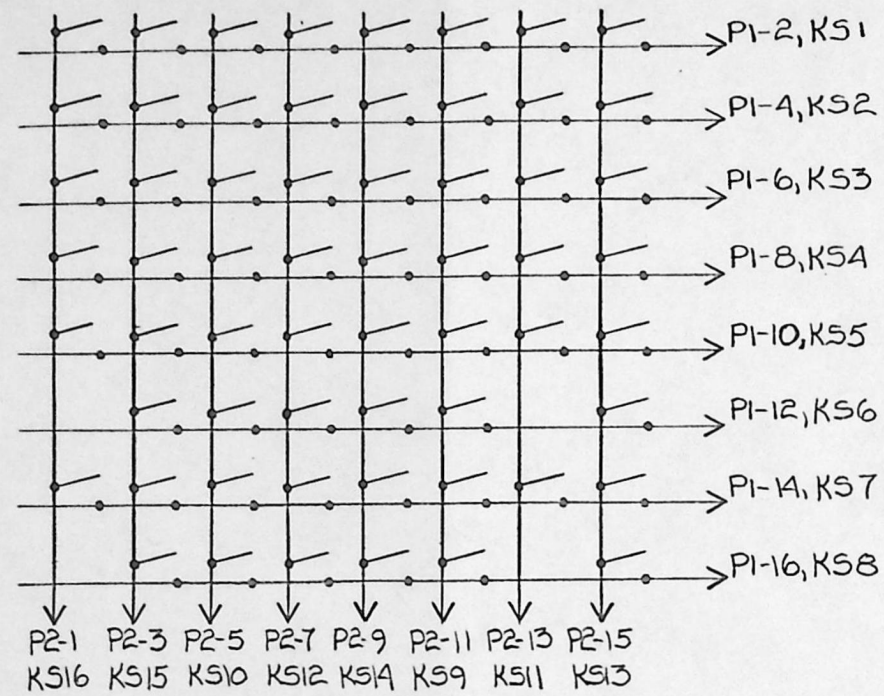
CIC-6A, MODULE 1
DEVICE SELECT IS 0

SWITCH NUMBERS INDICATE
THE SWITCH (KS) AND LED (LS)
MATRIX POSITION OF THE
CIC-6A MODULE

TOP VIEW

		2475 W. 2nd AVE. DENVER, COLORADO 80223	
SCALE	REVISIONS	BY	DATE
DATE	5/21/82		
DRN	GS H	END	
AP VD			
TOLERANCE		TITLE	
FRACT.	± 1/32	ANIMATE/CONTROL SWITCHES	
XX	± 015	CIC-2	
XXX	± 005		

MODULE 3
MISC. FUNCTION SWITCHES

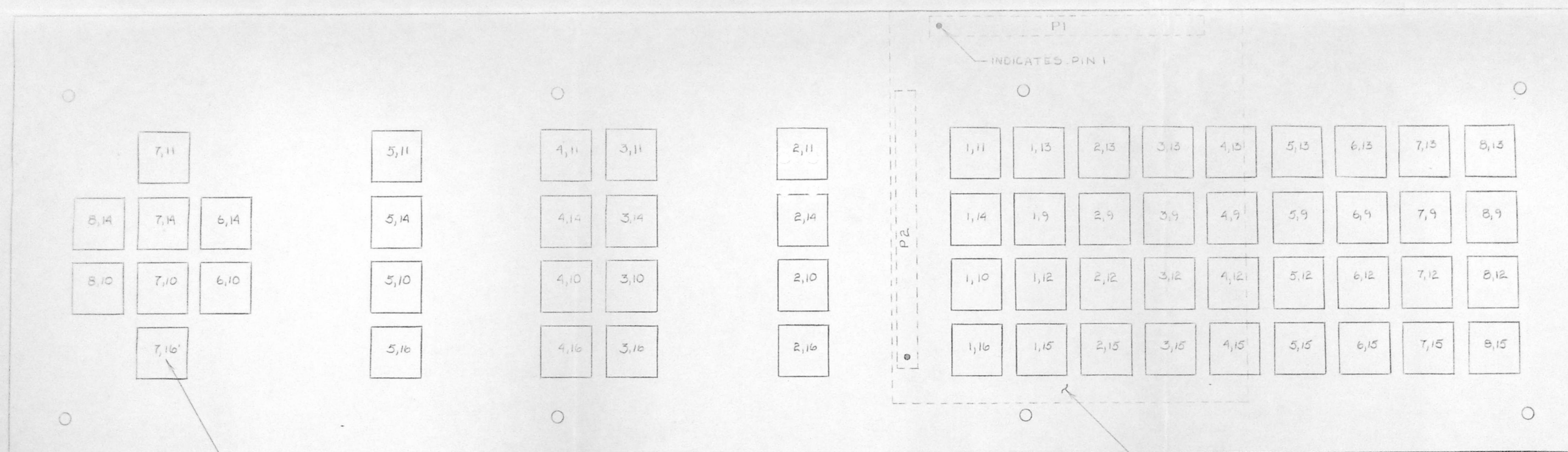


COMPUTER IMAGE CORP.
DENVER, COLORADO

SCALE	REVISIONS	BY	DATE
DATE 5/26/82			
DRN GSH CRD			
APVD			

TITLE
MISC. FUNCTION SWITCHES

NO
CIC-3



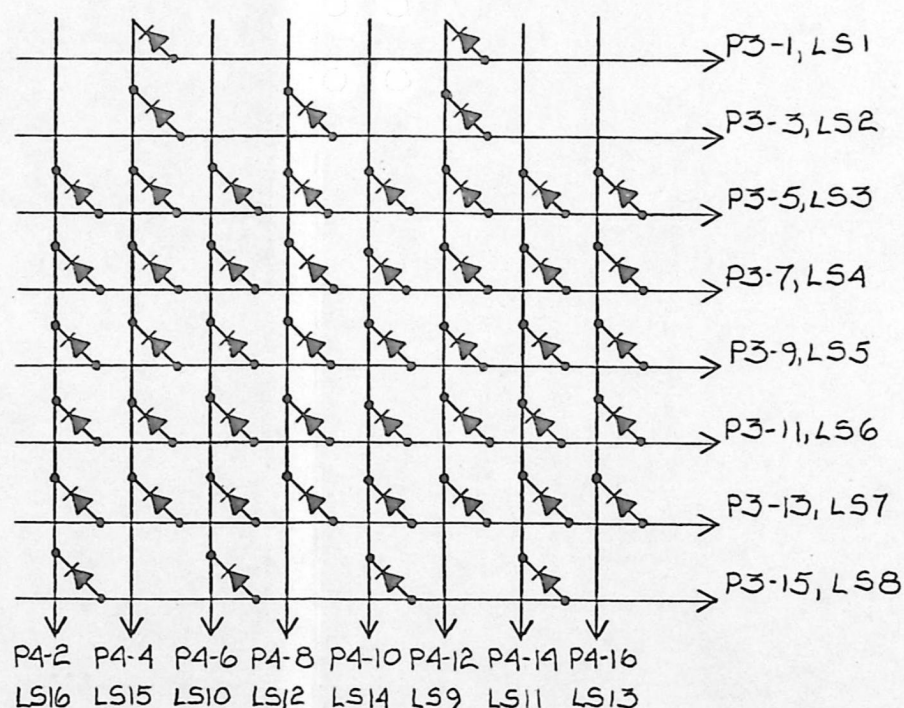
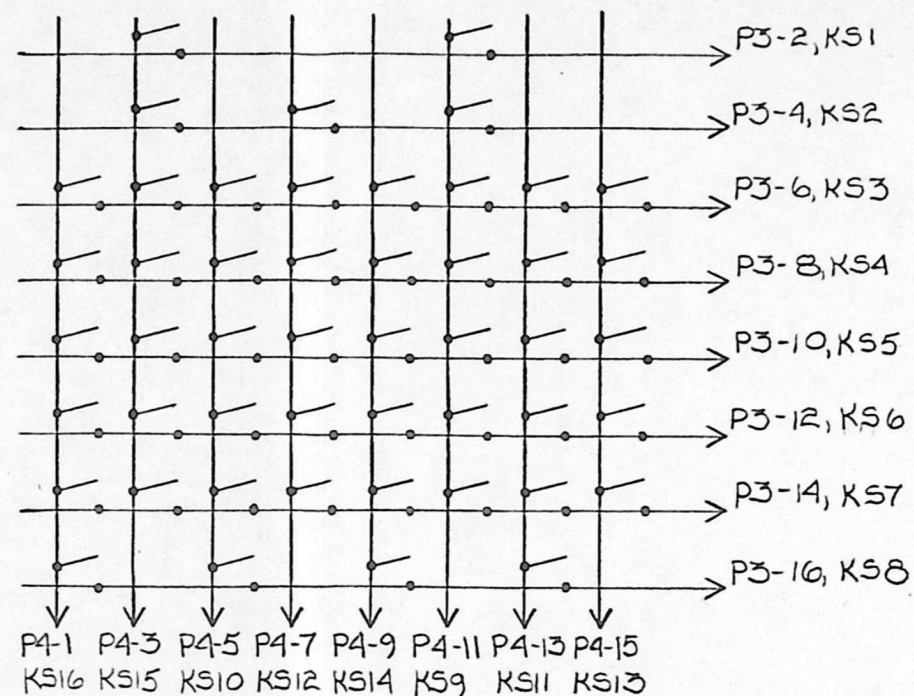
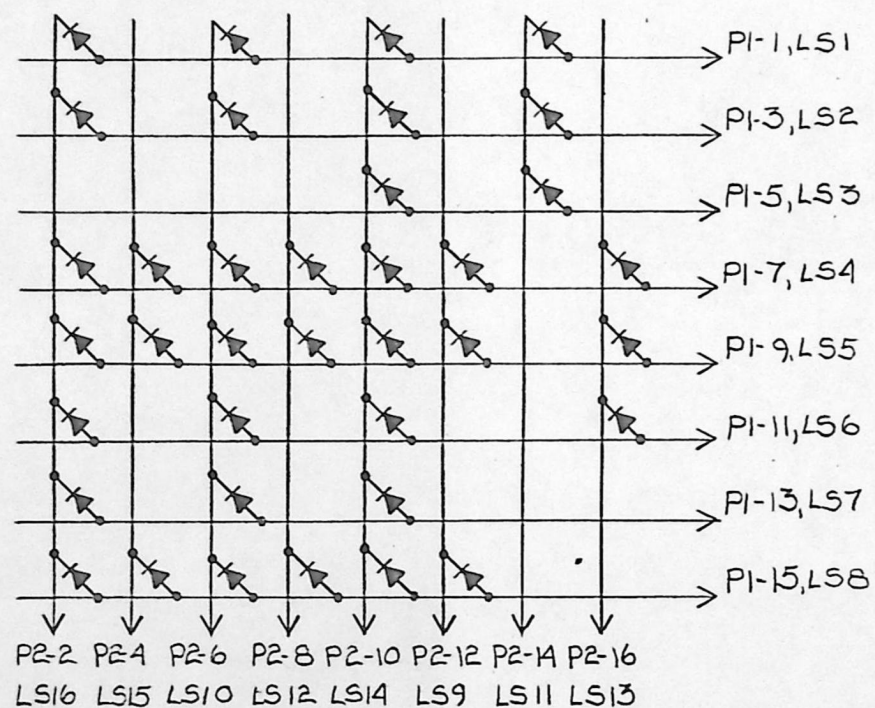
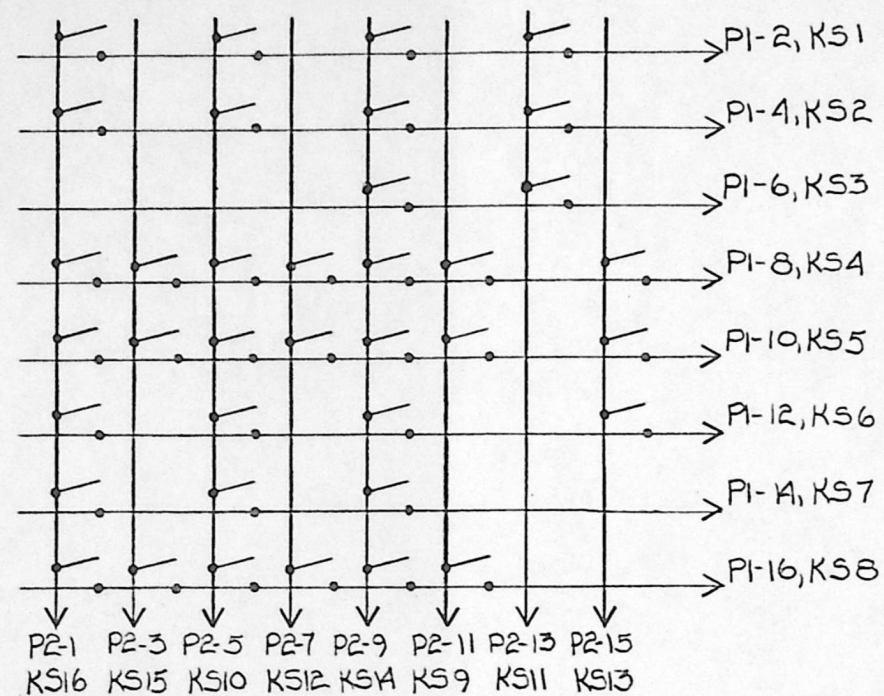
SWITCH NUMBERS INDICATE THE
SWITCH (KS) AND LED (LS) MATRIX
POSITION OF THE CIC-6A MODULE

TOP VIEW

CIC-6A, MODULE 3
DEVICE SELECT IS 2

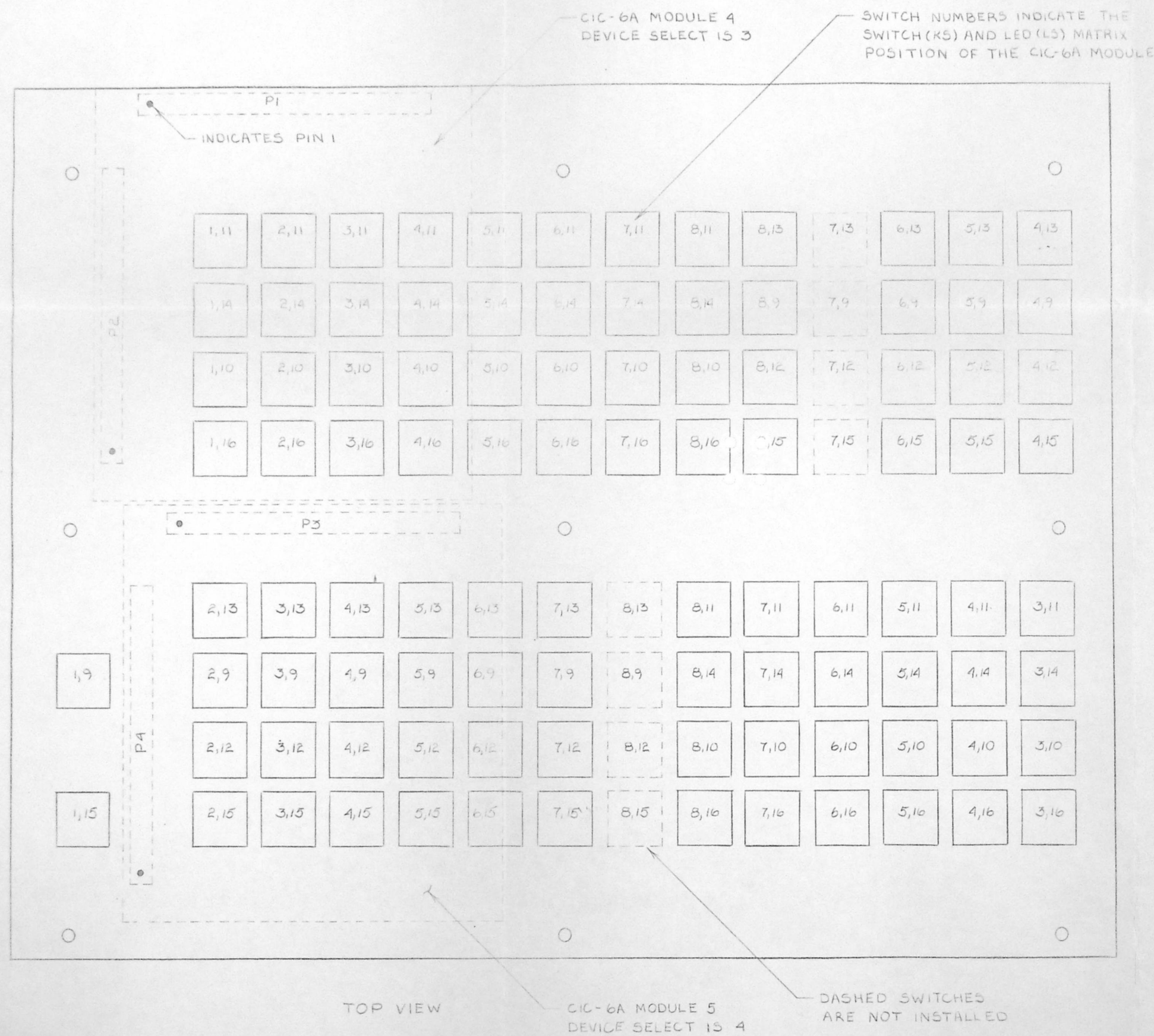
TOLERANCE	
FRACT	± 1/32
.XX	± .015
XXX	± .005

		2475 W. 2nd AVE. DENVER, COLORADO 80223	
SCALE	REVISIONS	BY	DATE
DATE 5/28/82			
DRN GSH	CKD		
AP VS			
TITLE		NO	
MISC. FUNCTION SWITCHES		CIC-3	



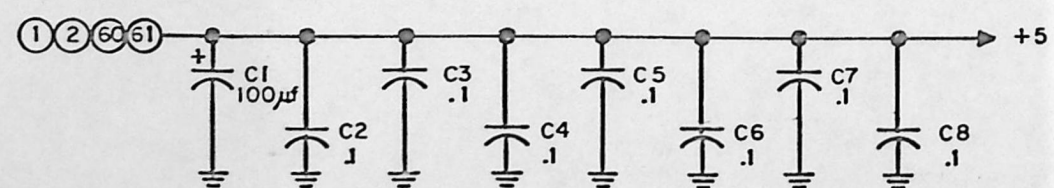
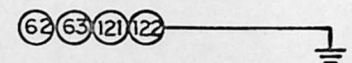
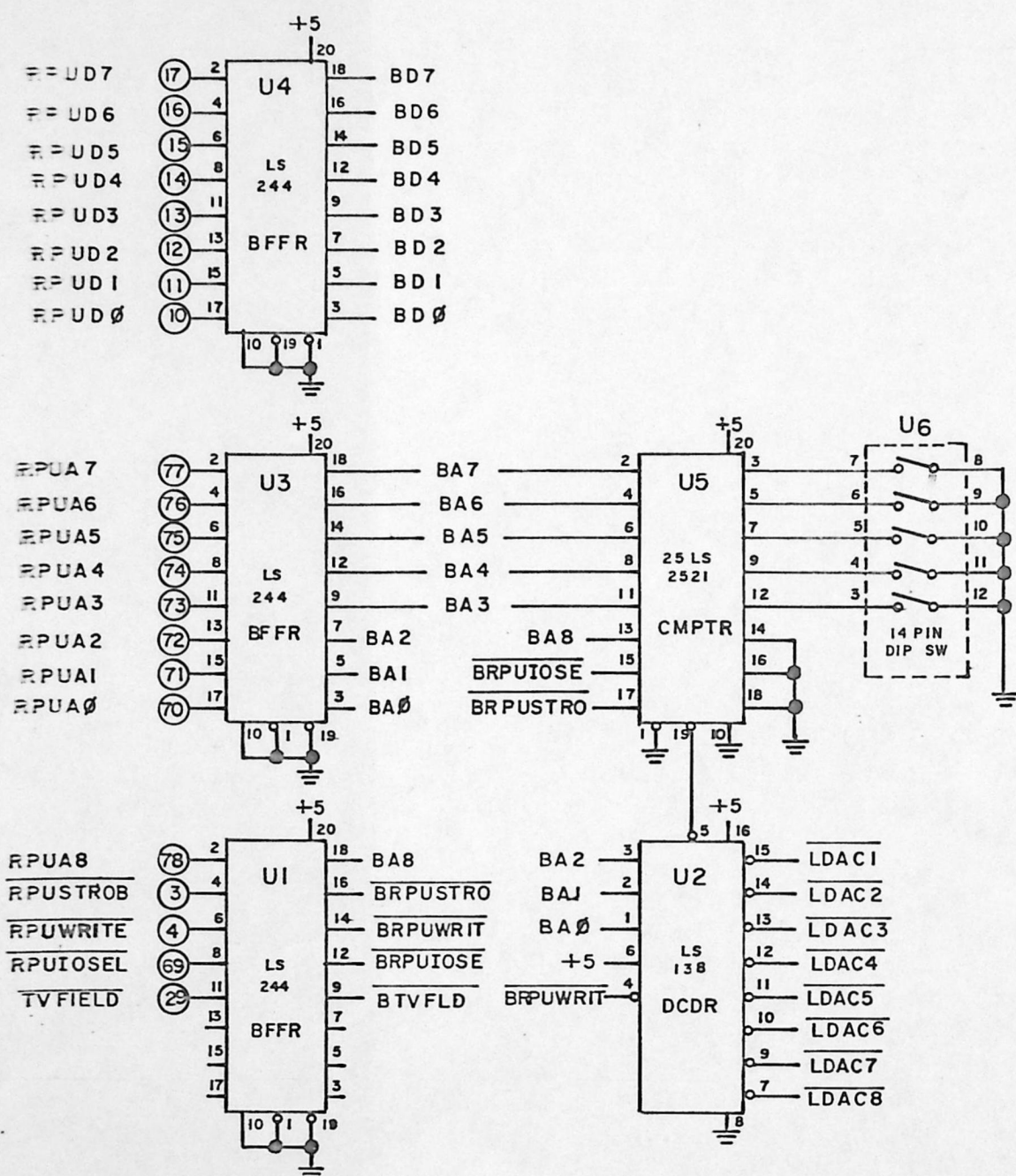
COMPUTER IMAGE CORP.
DENVER, COLORADO

SCALE	REVISIONS	BY	DATE
DATE 5/27/82			
DRN GSH CKD			
APVD			
TITLE SHAFT ENCODER SWITCHES			NO CIC-4A

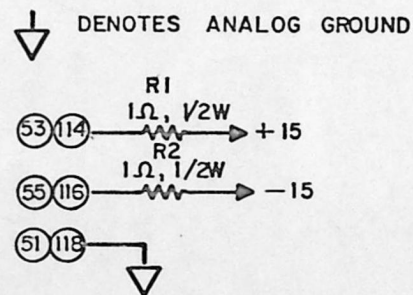
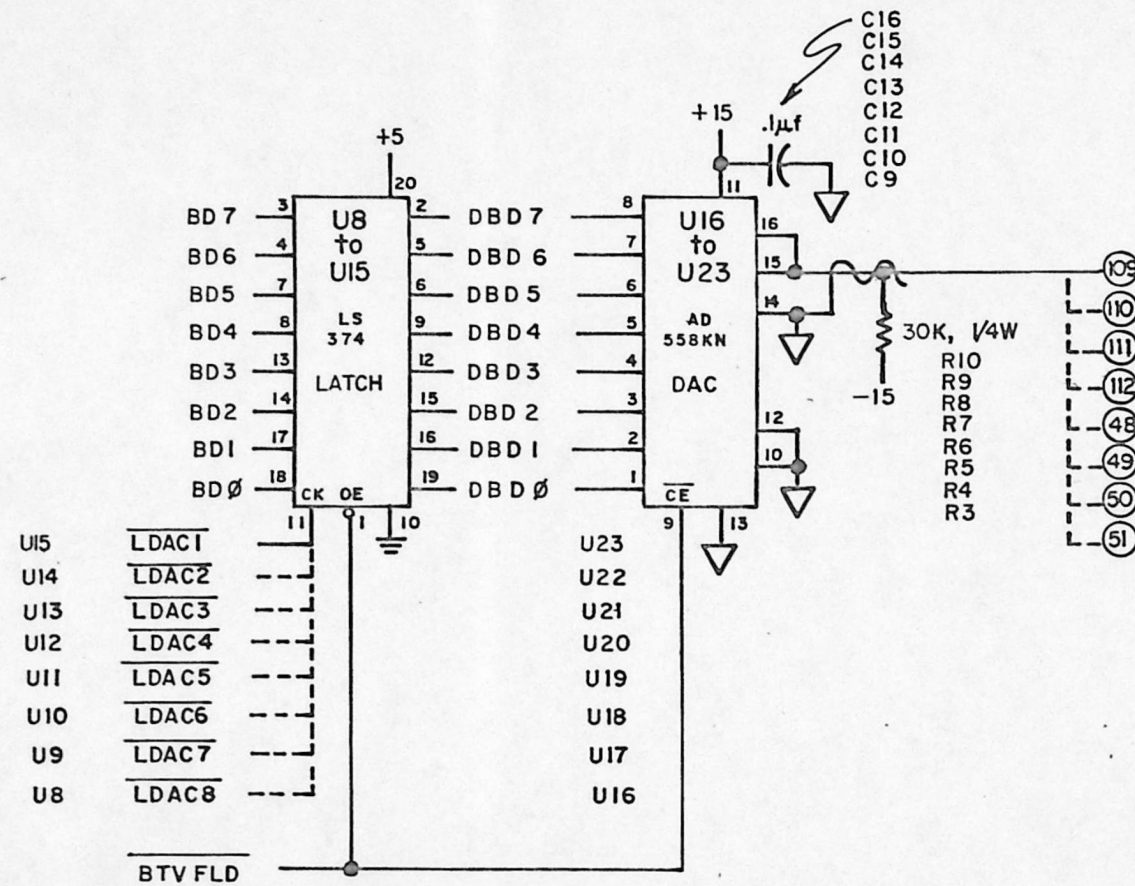


TOLERANCE	
FRACT	± 1/32
XX	± .015
XXX	± .005

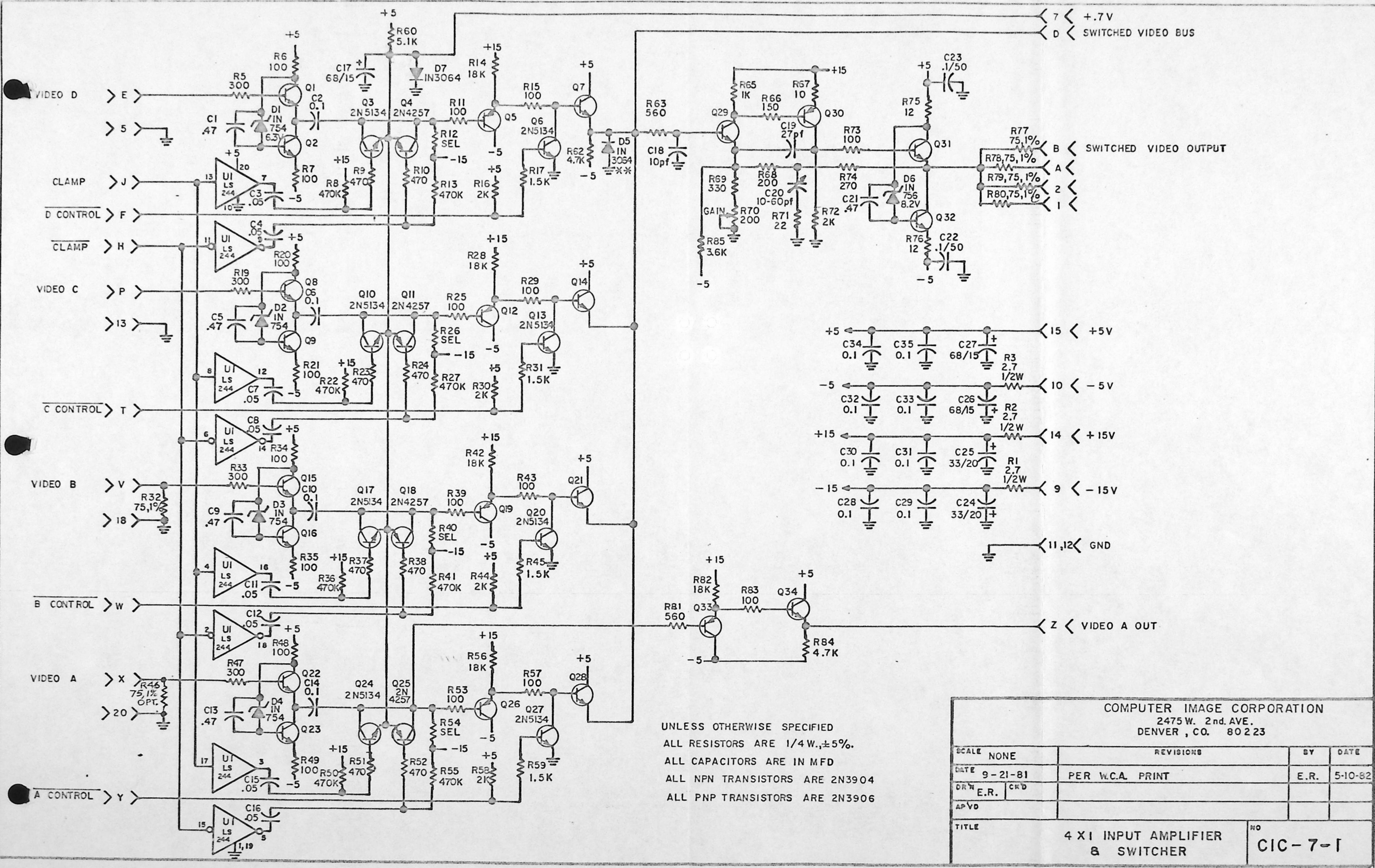
COMPUTER IMAGE CORPORATION		2475 W. 2nd AVE DENVER, COLORADO 80223	
SCALE	REVISIONS	BY	DATE
DATE 6/1/82			
DRN SSH	CAD		
TITLE		NO	
SHAFT ENCODER SWITCHES		CIC-4A	



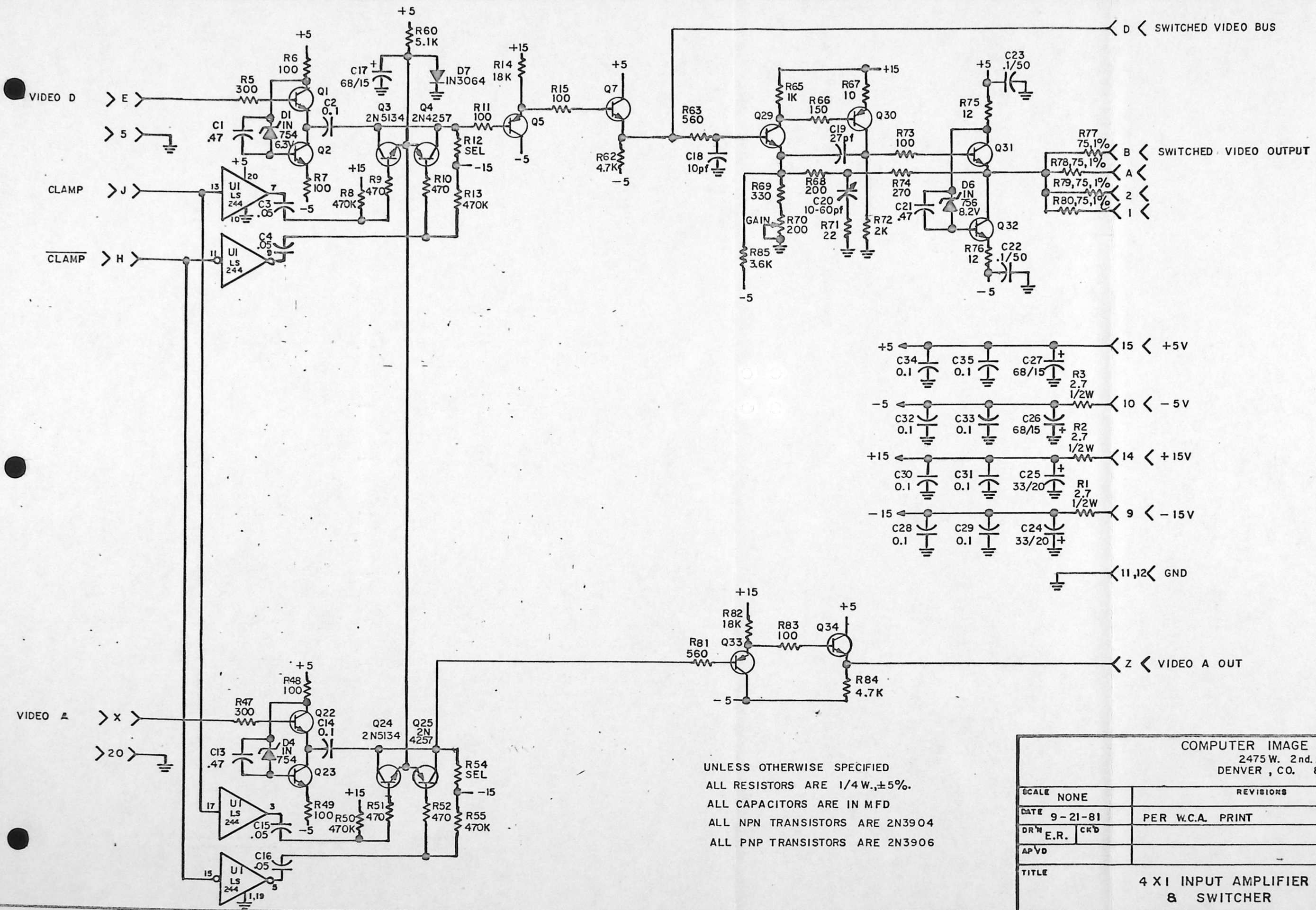
COMPUTER IMAGE CORPORATION 2475 W. 2nd AVE DENVER, CO. 80223			
SCALE NONE	REVISIONS	BY	DATE
DATE 6-30-81	PER W.C.A. PRINT	E.R.	3-10
DRN E. R.	CKD		
APVD			
TITLE DIGITAL INTERFACE 8 BIT DACS		NO CIC-5 SHEET 1 OF 2	



COMPUTER IMAGE CORPORATION 2475 W. 2nd AVE DENVER, CO. 80223			
SCALE NONE	REVISIONS	BY	DATE
DATE 6-30-81	PER W.C.A. PRINT	E.R.	3-10
DRN E.R.	CKD		
APVD			
TITLE 8 BIT DACS (ONE OF EIGHT)		NO CIC-5 SHEET 2 OF 2	

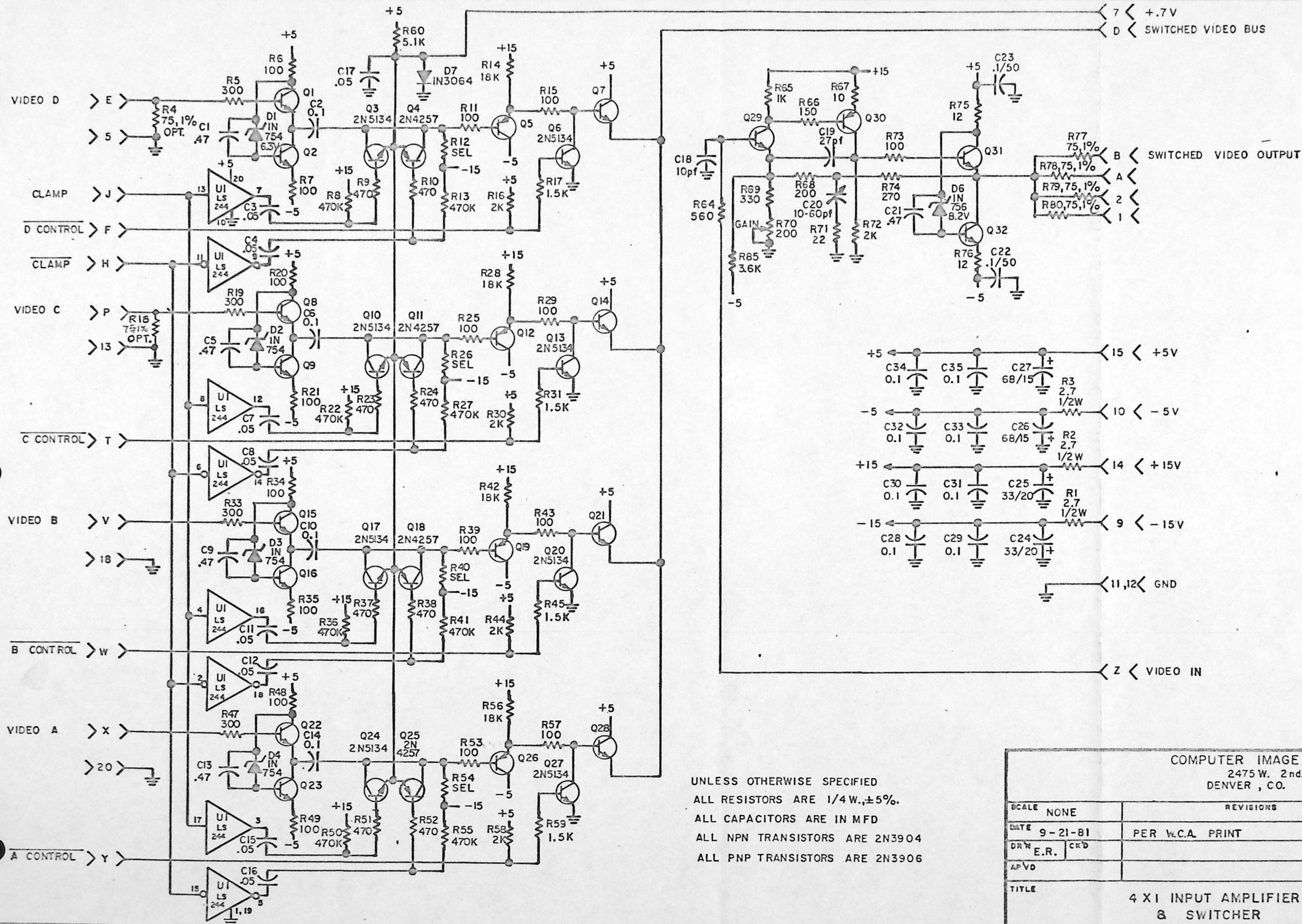


COMPUTER IMAGE CORPORATION 2475 W. 2nd. AVE. DENVER, CO. 80223			
SCALE NONE	REVISIONS	BY	DATE
DATE 9-21-81	PER W.C.A. PRINT	E.R.	5-10-82
DRN E.R.	CR'D		
APVD			
TITLE 4 X 1 INPUT AMPLIFIER & SWITCHER		NO CIC-7-1	



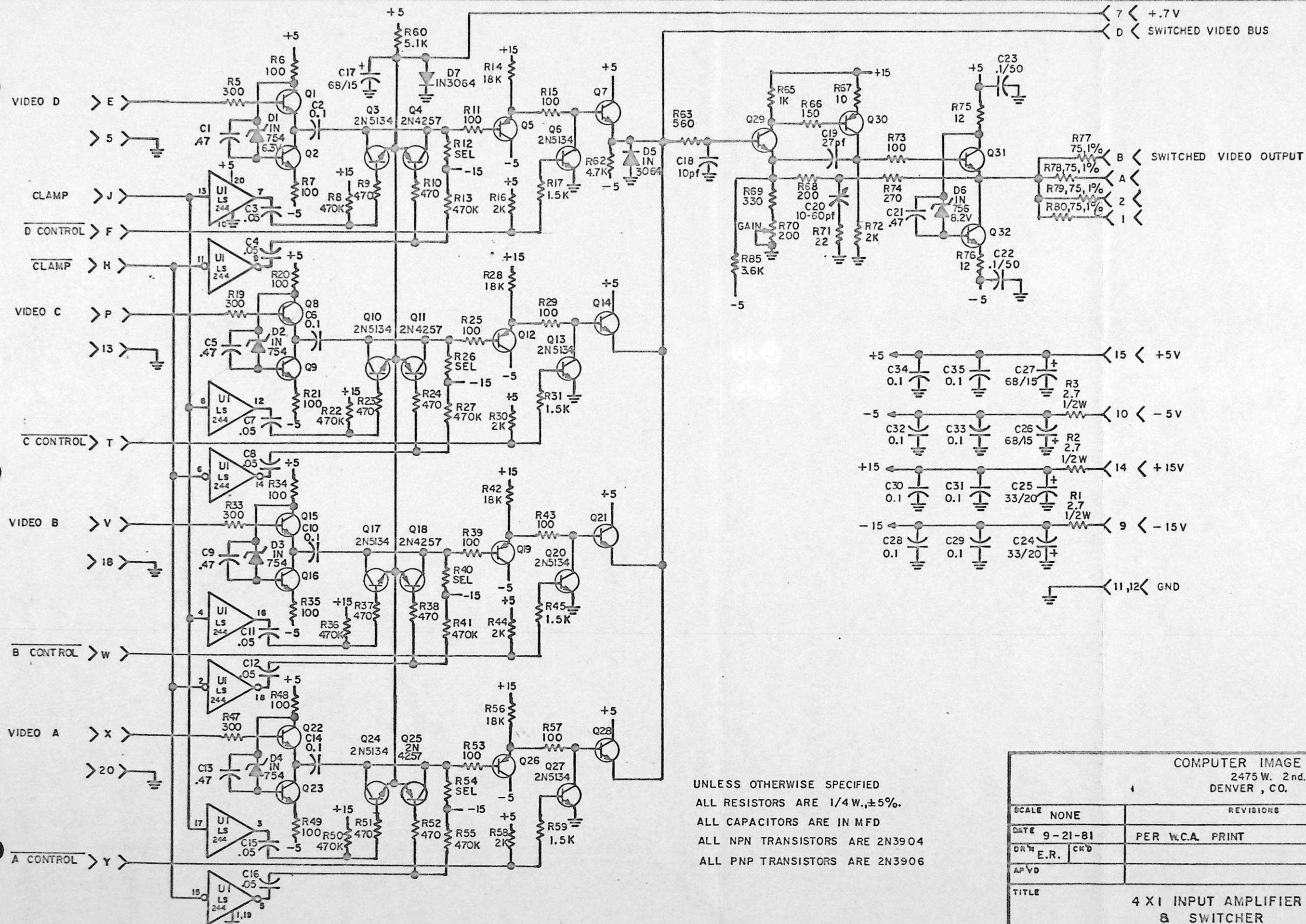
UNLESS OTHERWISE SPECIFIED
 ALL RESISTORS ARE 1/4 W., ±5%.
 ALL CAPACITORS ARE IN MFD
 ALL NPN TRANSISTORS ARE 2N3904
 ALL PNP TRANSISTORS ARE 2N3906

COMPUTER IMAGE CORPORATION 2475 W. 2nd AVE. DENVER, CO. 80223			
SCALE NONE	REVISIONS	BY	DATE
DATE 9-21-81	PER W.C.A. PRINT	E.R.	5-10-82
DRN E.R.	CKD		
APVD			
TITLE 4 XI INPUT AMPLIFIER & SWITCHER		NO CIC-7-3A	



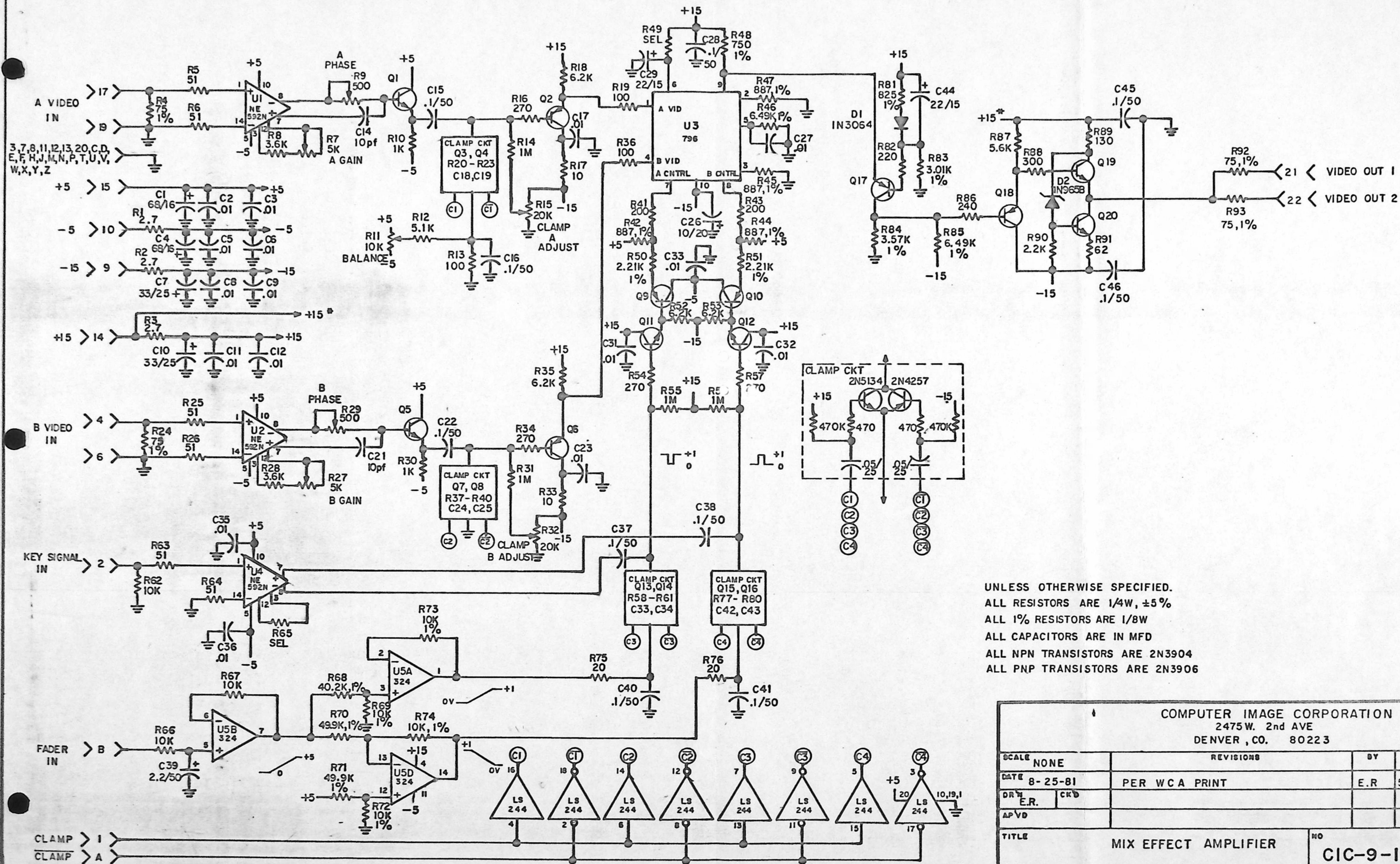
UNLESS OTHERWISE SPECIFIED
 ALL RESISTORS ARE 1/4W., ±5%.
 ALL CAPACITORS ARE IN MFD
 ALL NPN TRANSISTORS ARE 2N3904
 ALL PNP TRANSISTORS ARE 2N3906

COMPUTER IMAGE CORPORATION 2475 W. 2nd. AVE. DENVER, CO. 80223				
SCALE	NONE	REVISIONS	BY	DATE
DATE	9-21-81	PER W.C.A. PRINT	E.R.	5-10-82
DRW	E.R.	CKD		
APVD				
TITLE	4 XI INPUT AMPLIFIER & SWITCHER			NO CIC-7-4



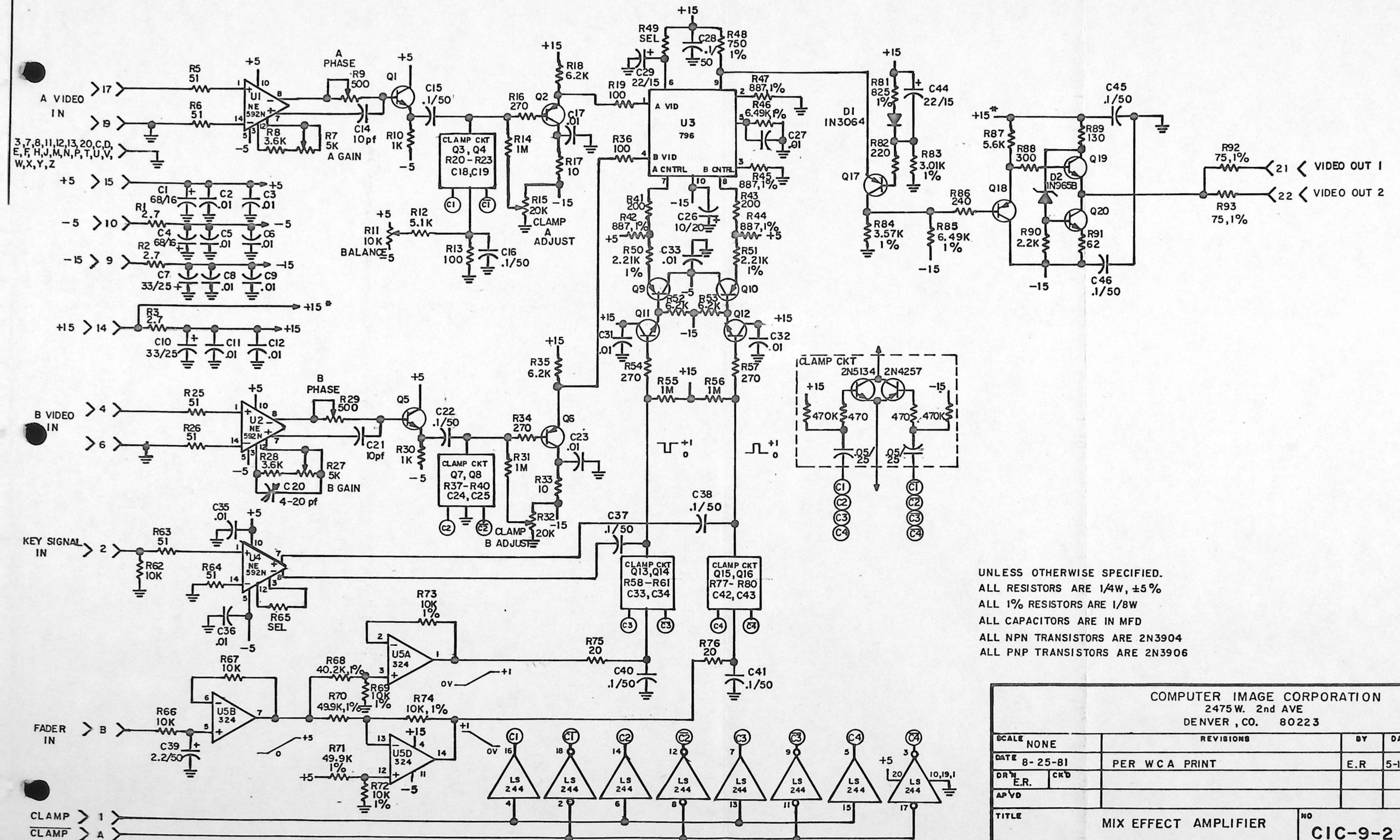
COMPUTER IMAGE CORPORATION
 2475 W. 2nd. AVE.
 DENVER, CO. 80223

SCALE	NONE	REVISIONS	BY	DATE
DATE	9-21-81	PER W.C.A. PRINT	E.R.	5-10-82
DRN	E.R.			
APVD				
TITLE	4 XI INPUT AMPLIFIER & SWITCHER			NO CIC-7-5

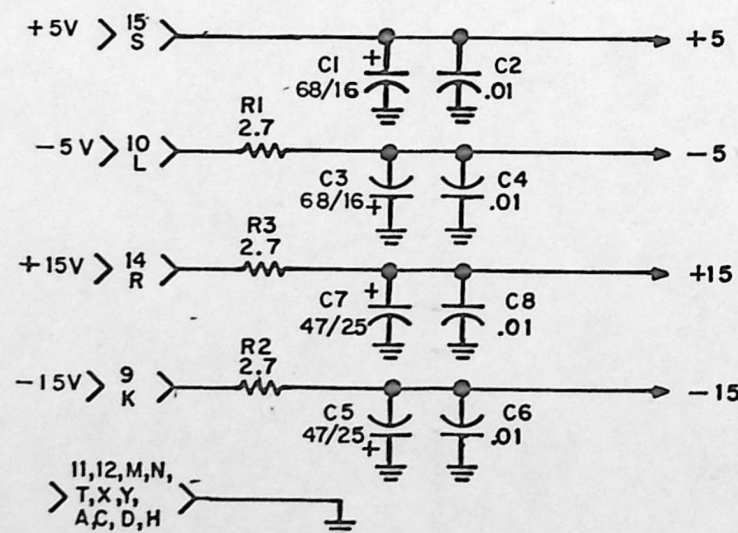
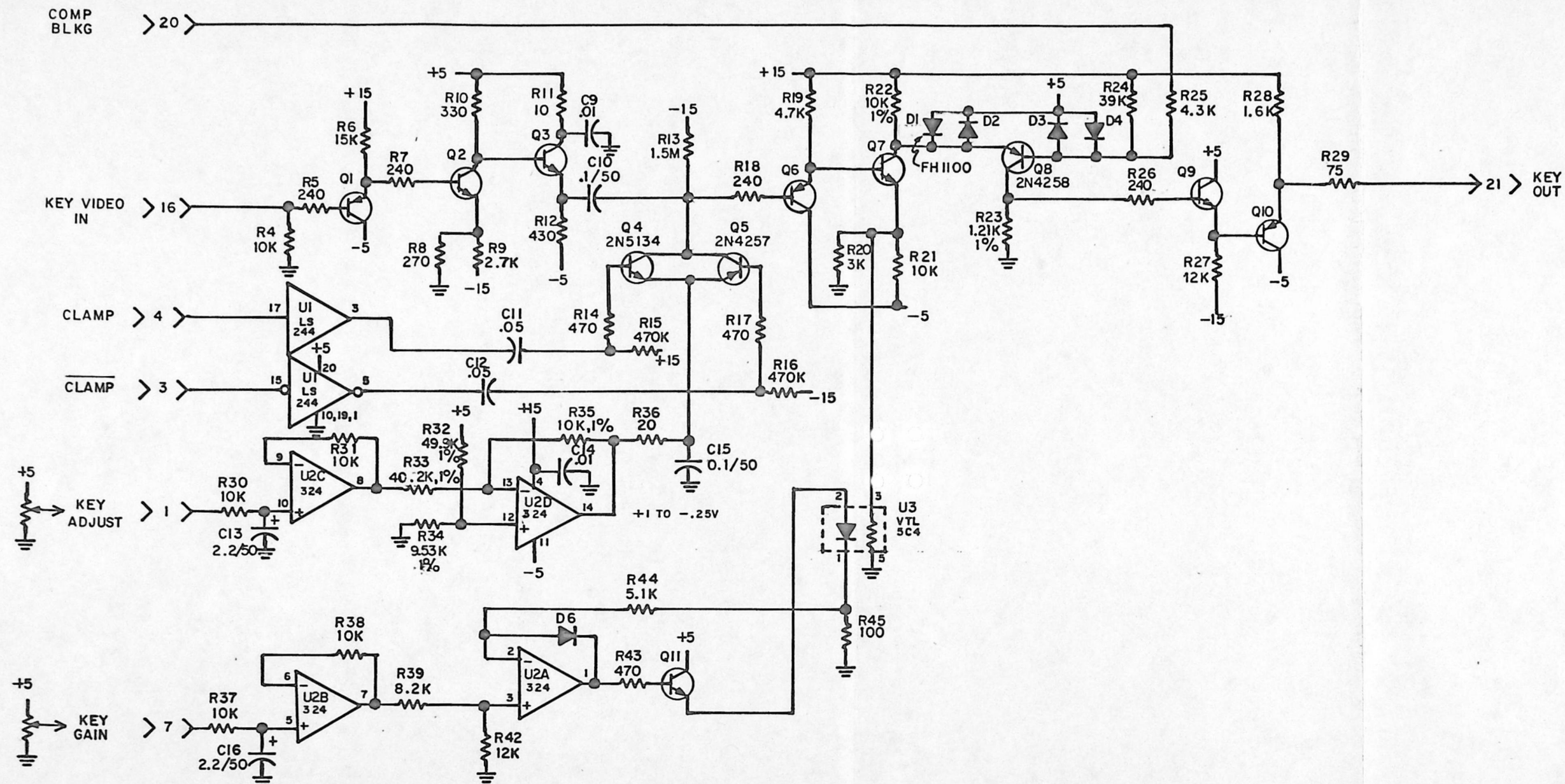


UNLESS OTHERWISE SPECIFIED.
 ALL RESISTORS ARE 1/4W, $\pm 5\%$
 ALL 1% RESISTORS ARE 1/8W
 ALL CAPACITORS ARE IN MFD
 ALL NPN TRANSISTORS ARE 2N3904
 ALL PNP TRANSISTORS ARE 2N3906

COMPUTER IMAGE CORPORATION 2475 W. 2nd AVE DENVER, CO. 80223			
SCALE NONE	REVISIONS	BY	DATE
DATE 8-25-81	PER WCA PRINT	E.R	5-10-82
DRN E.R.	CKD		
APVD			
TITLE MIX EFFECT AMPLIFIER		NO CIC-9-1	

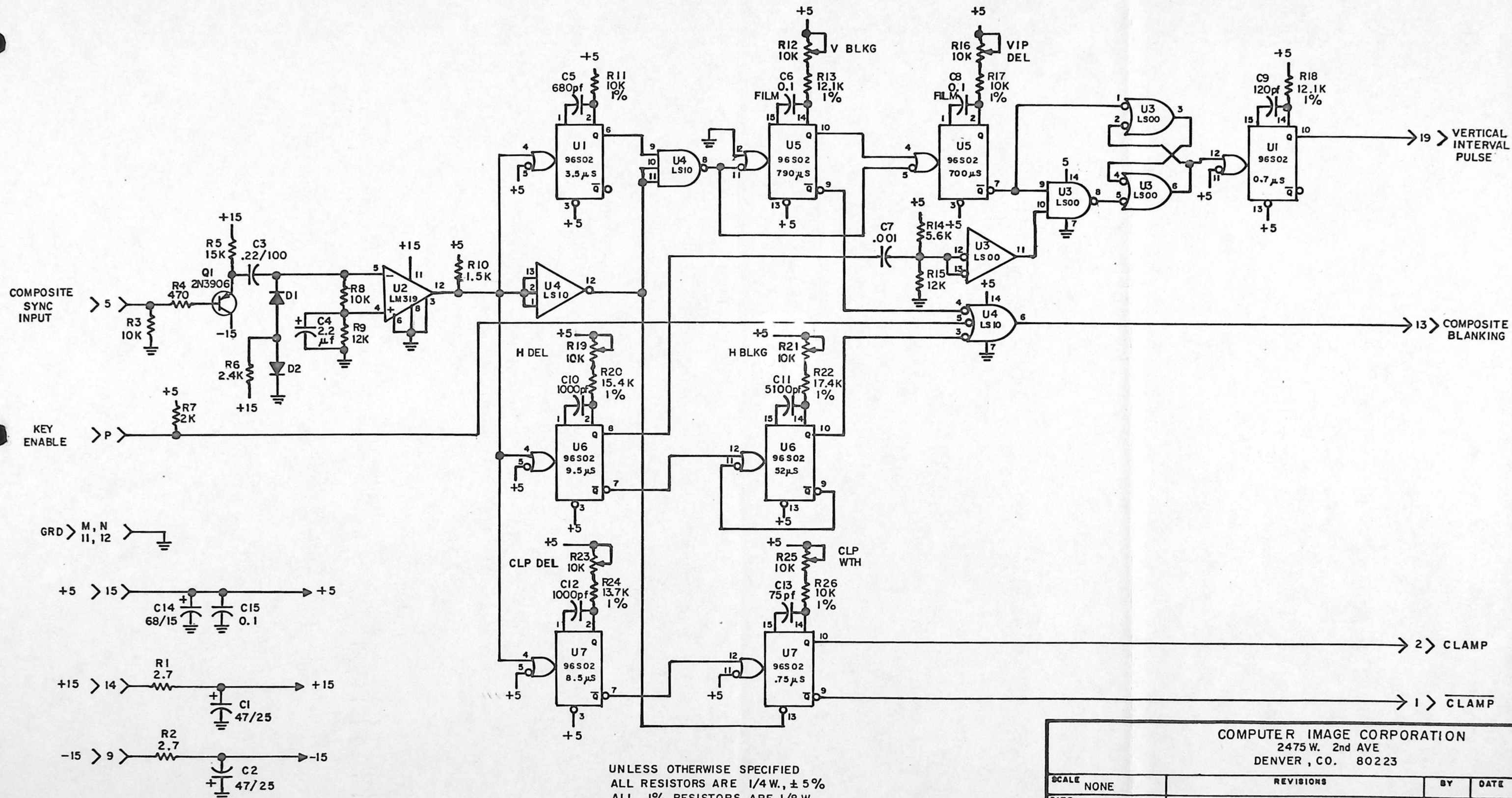


COMPUTER IMAGE CORPORATION 2475 W. 2nd AVE DENVER , CO. 80223					
SCALE NONE		REVISIONS		BY	DATE
DATE 8-25-81		PER WCA PRINT		E.R	5-10-82
DRN	CKD				
E.R.					
APVD					
TITLE MIX EFFECT AMPLIFIER				NO CIC-9-2	

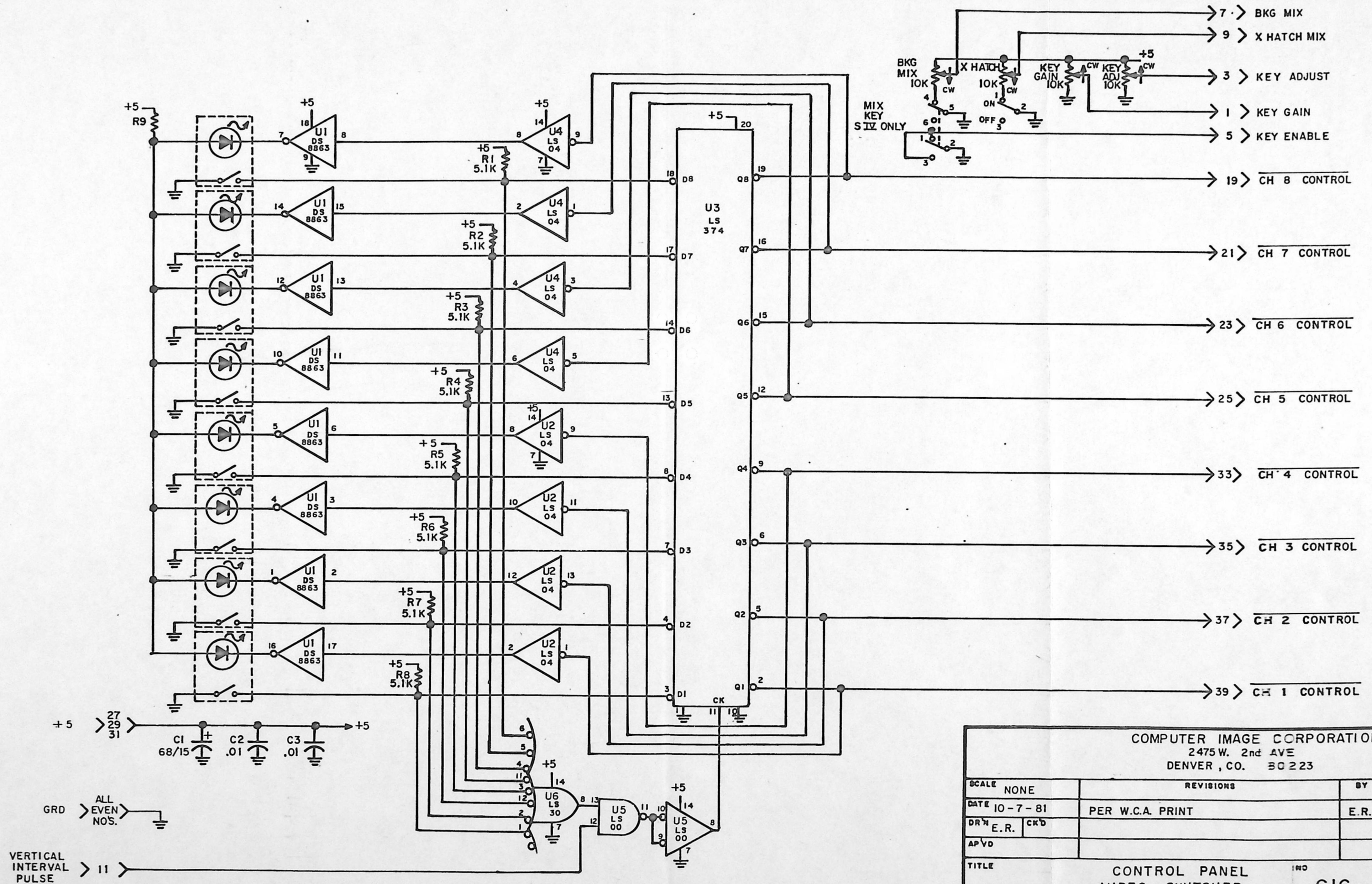


UNLESS OTHERWISE SPECIFIED
 ALL DIODES ARE 1N3064
 ALL RESISTORS ARE 1/4 W., $\pm 5\%$.
 ALL 1% RESISTORS ARE 1/8 W.
 ALL CAPACITORS IN MFD's
 ALL NPN TRANSISTORS ARE 2N3904
 ALL PNP TRANSISTORS ARE 2N3906

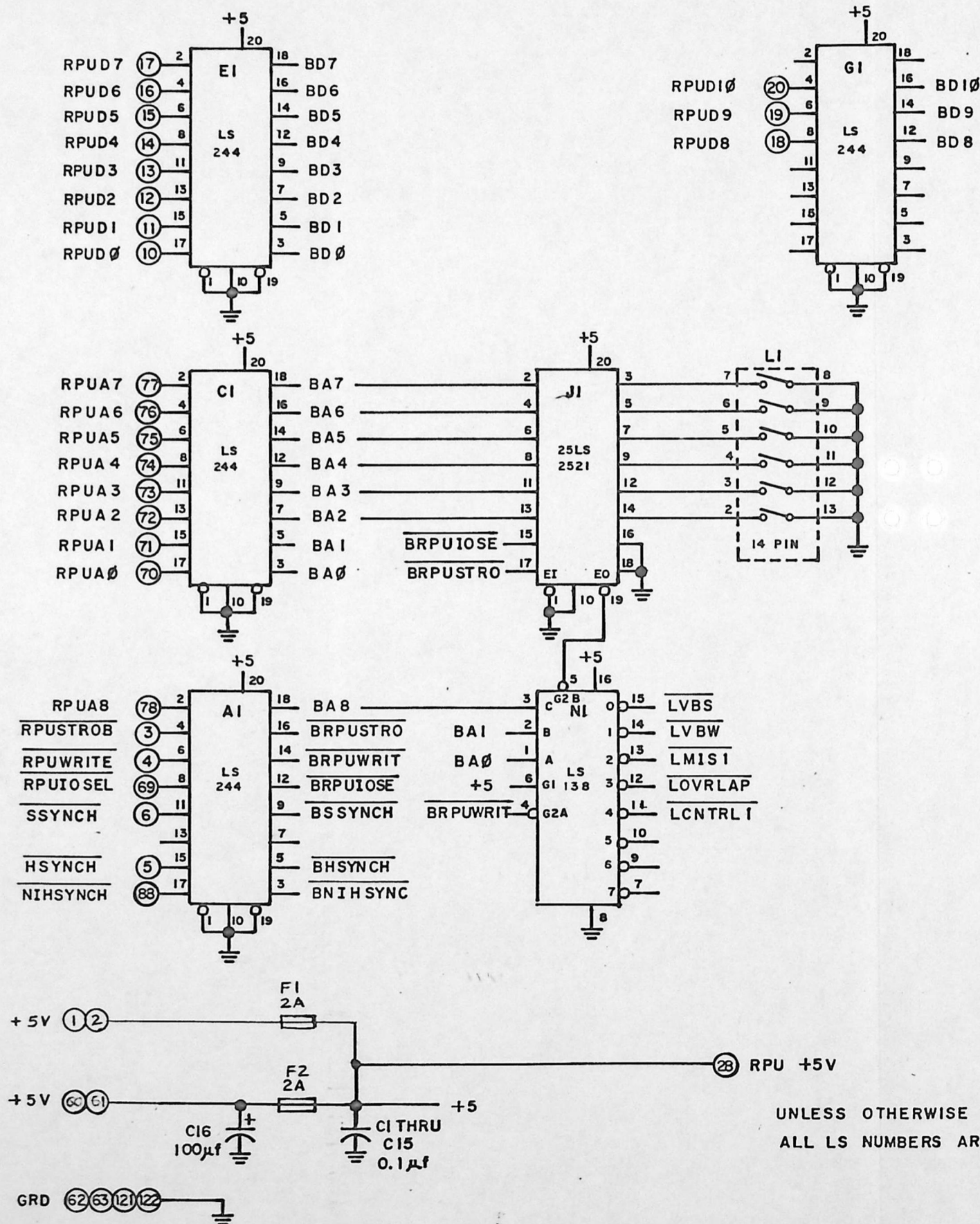
COMPUTER IMAGE CORPORATION			
2475W. 2nd AVE			
DENVER, CO. 80223			
SCALE NONE	REVISIONS		BY DATE
DATE 8-14-81	PER W.C.A. PRINT		E.R. 3-10
DRW E.R.	CRD		
APVD			
TITLE KEY PROCESSOR			NO CIC-10



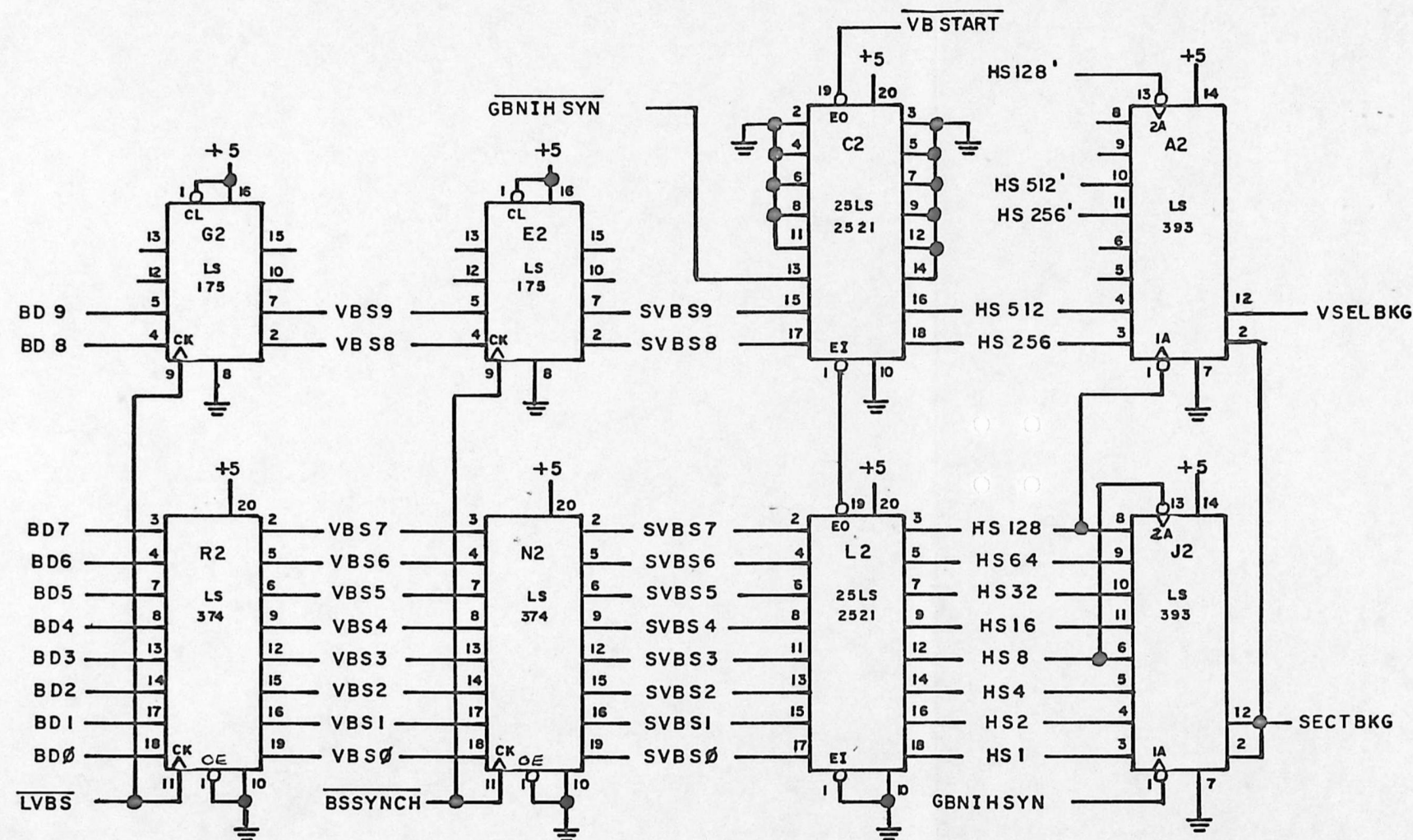
COMPUTER IMAGE CORPORATION			
2475 W. 2nd AVE			
DENVER, CO. 80223			
SCALE NONE	REVISIONS		BY DATE
DATE 8-14-81	PER W.C.A. PRINT		E.R. 3-10
DRN E.R.	CKD		
APVD			
TITLE TIMING CIRCUIT			NO CIC-11



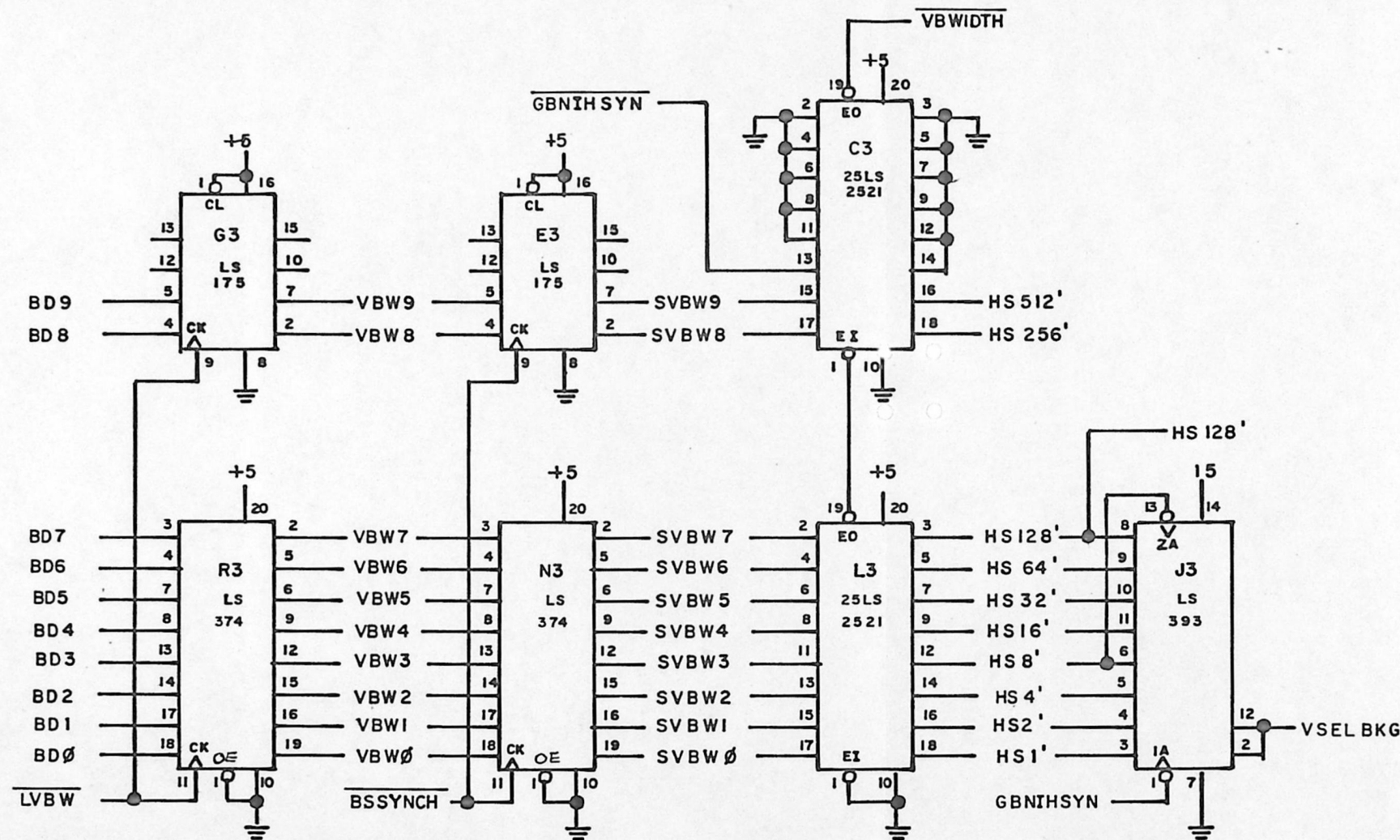
COMPUTER IMAGE CORPORATION 2475 W. 2nd AVE DENVER, CO. 80223			
SCALE NONE	REVISIONS	BY	DATE
DATE 10-7-81	PER W.C.A. PRINT	E.R.	3-10
DRN E.R.	CRD		
APVD			
TITLE	CONTROL PANEL VIDEO SWITCHER		
	CIC-12		



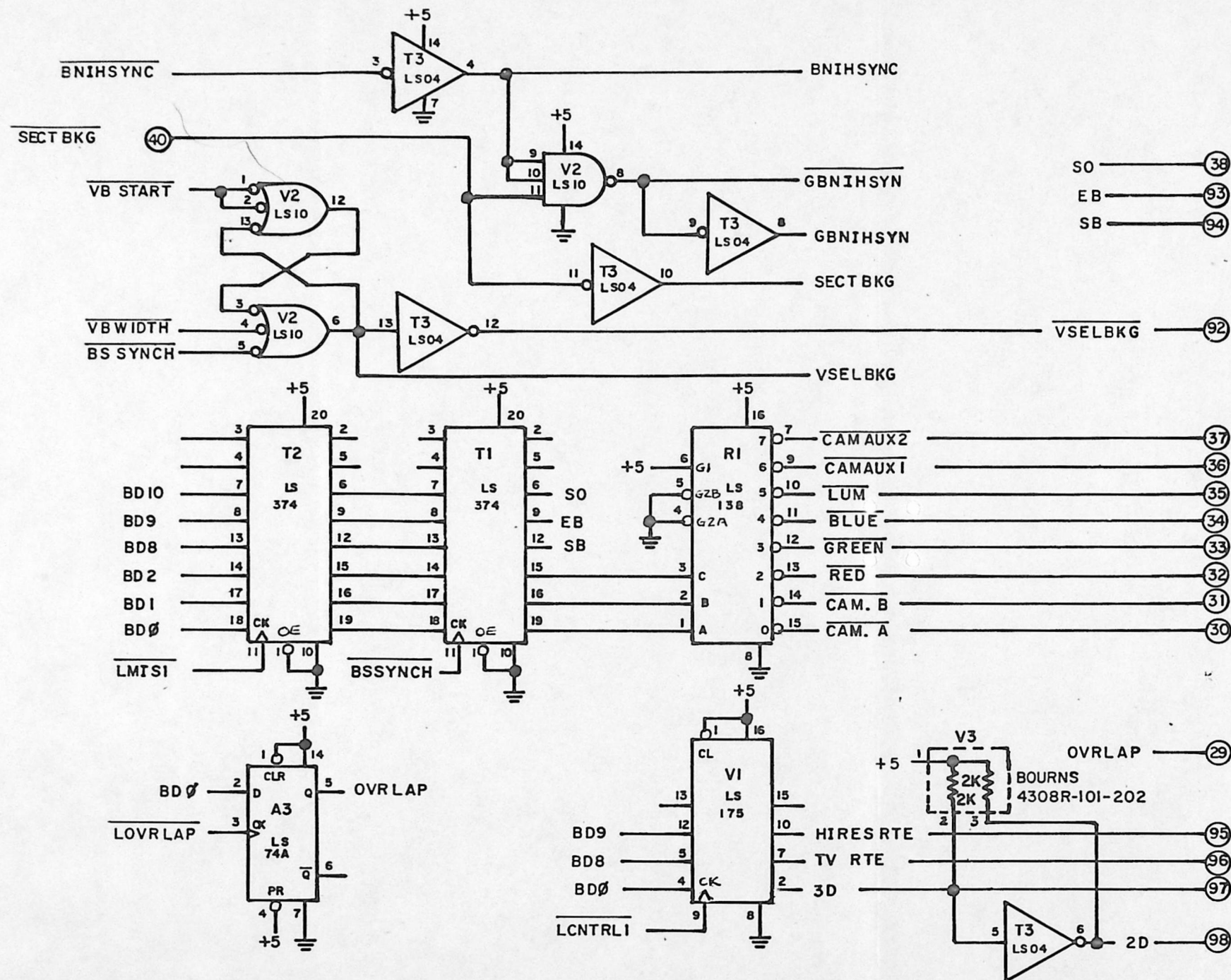
COMPUTER IMAGE CORPORATION 2475 W. 2nd AVE DENVER, CO. 80223			
SCALE	REVISIONS	BY	DATE
NONE			
DATE 9-14-81	PER W.C.A. PRINT	E.R.	3-10
DRN E.R.	CRD	" " "	E.R.
APVD			5-10-82
TITLE DIGITAL CONTROL FOR VERTICAL SELECTIVE BLANKING AND FUNCTION DECODER			NO CIC-W-13 SHEET 1 OF 4



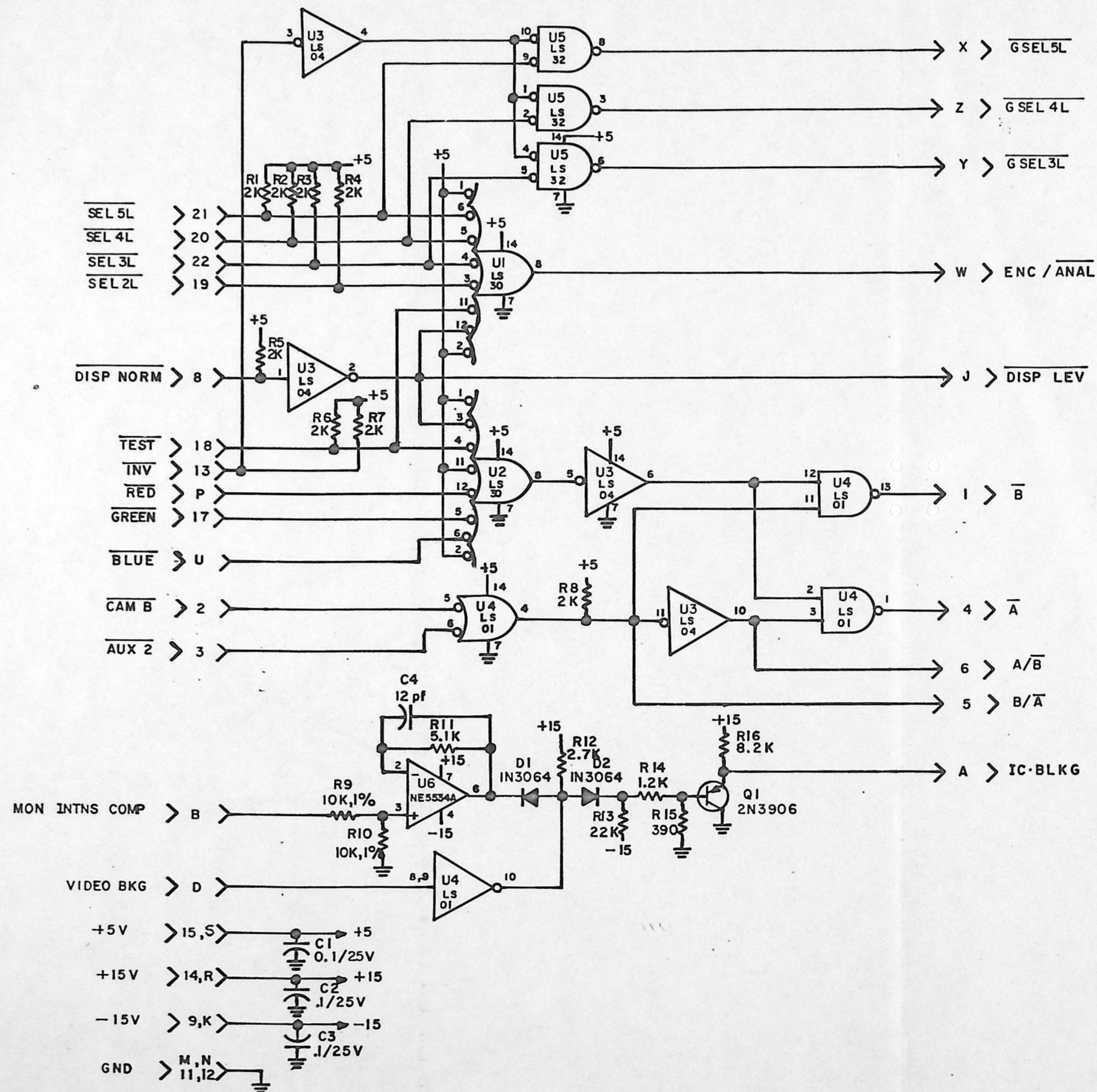
COMPUTER IMAGE CORPORATION			
2475W. 2nd AVE			
DENVER, CO. 80223			
SCALE	NONE	REVISIONS	BY DATE
DATE	9-14-81	PER W.C.A. PRINT	E.R. 3-10
DRN	E.R.	CKD	
APVD			
TITLE	VERTICAL SELECTIVE BLANKING START CONTROL FOR VERTICAL SELECTIVE BLANKING AND FUNCTION DECODER		NO CIC-W-13 SHEET 2 OF 4



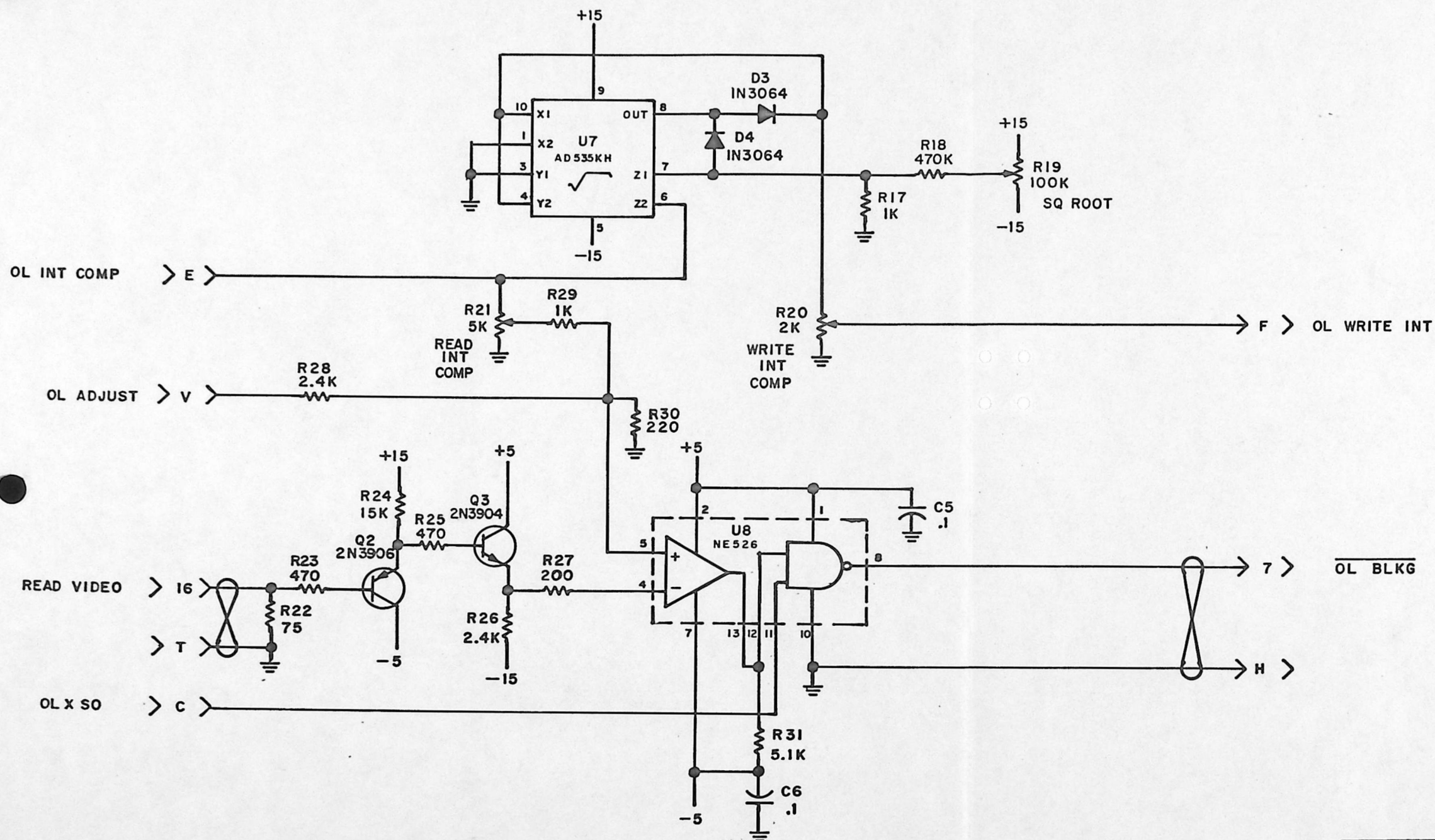
COMPUTER IMAGE CORPORATION			
2475 W. 2nd AVE			
DENVER, CO. 80223			
SCALE NONE	REVISIONS	BY	DATE
DATE 9-14-81	PER WCA. PRINT	E.R.	3-10
DRN E.R. CKD			
APVD			
TITLE	VERTICAL SELECTIVE BLANKING WIDTH CONTROL FOR VERTICAL SELECTIVE BLANKING AND FUNCTION DECODER		NO CIC-W-13 SHEET 3 OF 4



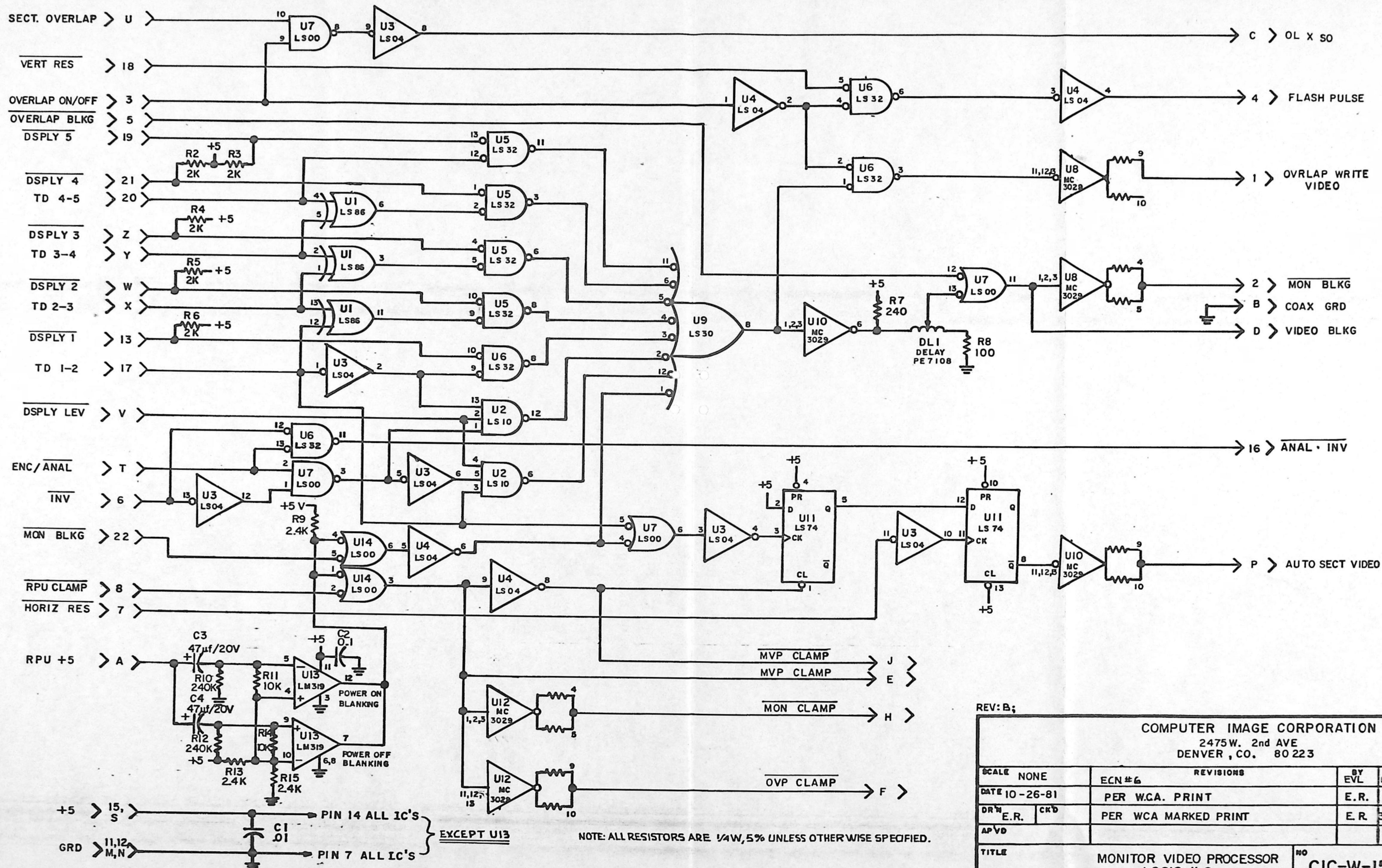
COMPUTER IMAGE CORPORATION			
2475 W. 2nd AVE DENVER, CO. 80223			
SCALE NONE	REVISIONS	BY	DATE
DATE 9-14-81	PER W.C.A. PRINT	ER.	3-10
DRW E.R.	CKD		
APVD			
TITLE	VERTICAL SELECTIVE BLANKING AND FUNCTION DECODER OUTPUTS		NO CIC-W-13 SHEET 4 OF 4

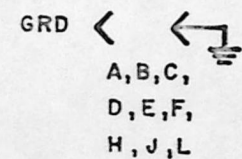


COMPUTER IMAGE CORPORATION 2475 W. 2nd AVE DENVER, CO. 80223				
SCALE	NONE	REVISIONS	BY	DATE
DATE	9-21-81	PER W.C.A. PRINT	E.R.	3-11
DRN	E.R.	CKD		
APVD				
TITLE	MONITOR VIDEO PROCESSOR LOGIC #1			NO CIC-W-14 SHEET 1 OF 2

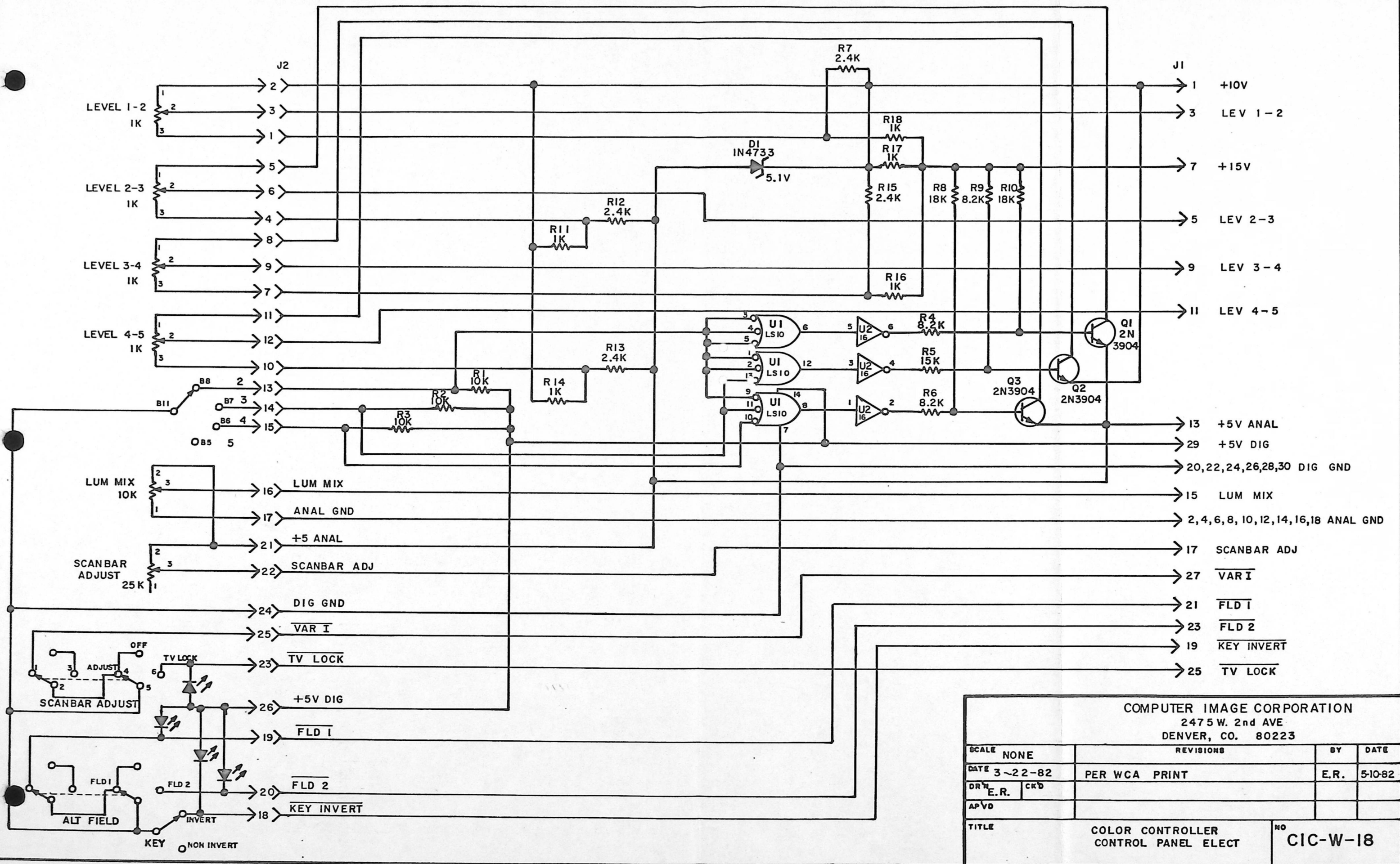


COMPUTER IMAGE CORPORATION 2475 W. 2nd AVE DENVER, CO. 80223			
SCALE NONE	REVISIONS	BY	DATE
DATE 9-21-81	PER W.C.A. PRINT	E.R.	3-15
DRW E.R.	CKD		
APVD			
TITLE	MONITOR VIDEO PROCESSOR LOGIC #1		
	NO. CIC-W-14 SHEET 2 OF 2		

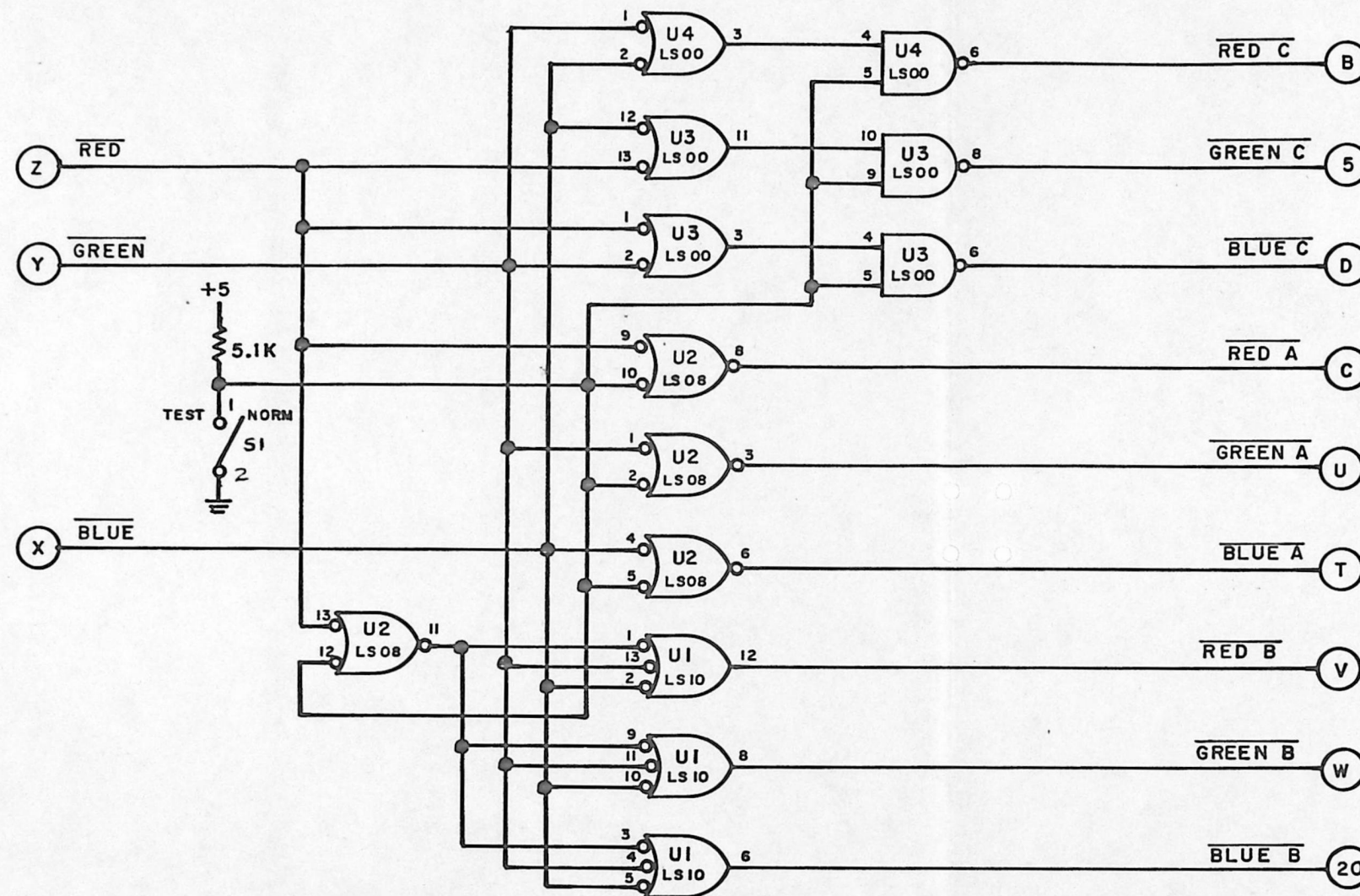




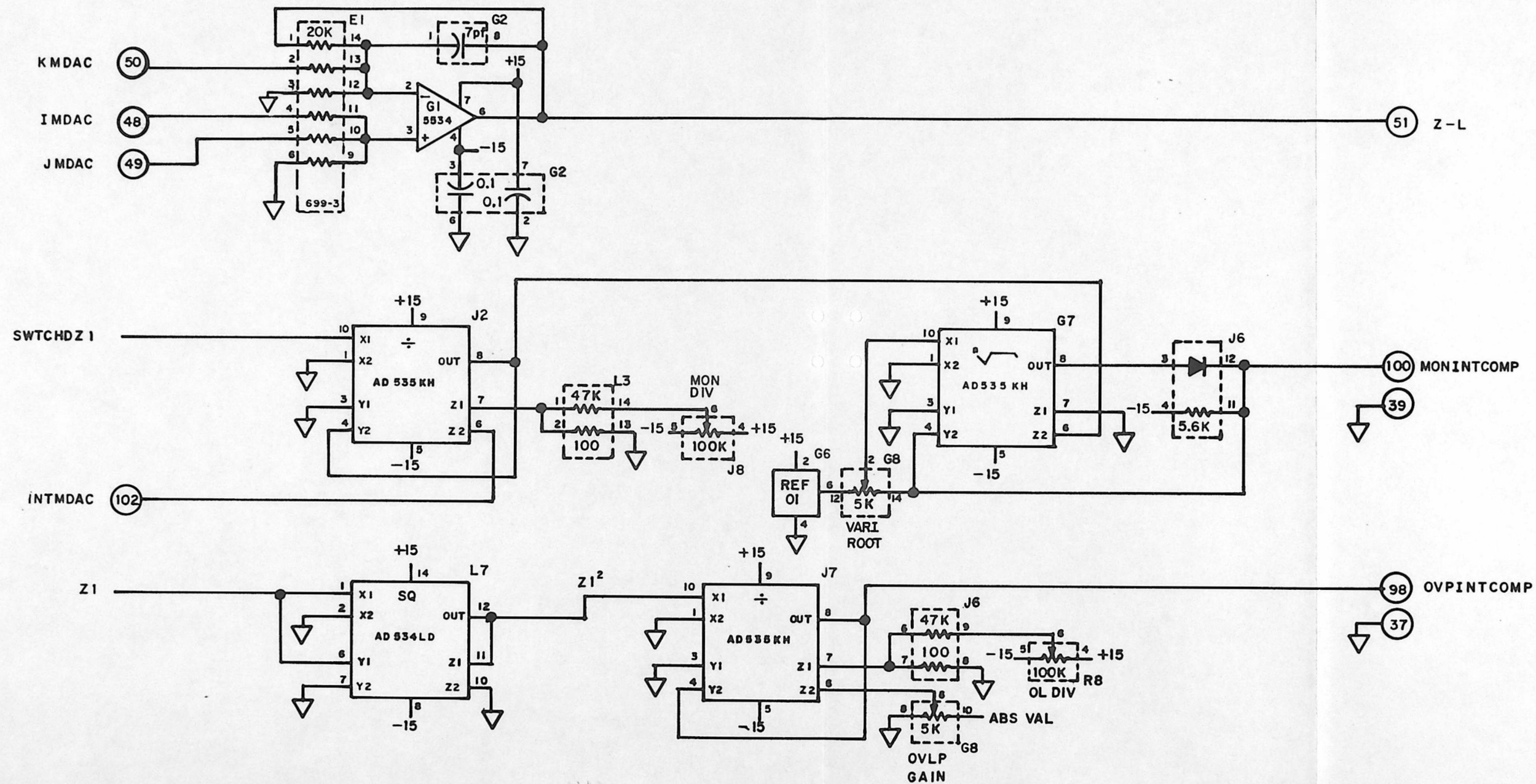
COMPUTER IMAGE CORPORATION			
2475 W. 2nd AVE			
DENVER, CO. 80223			
SCALE NONE	REVISIONS		BY
DATE 5-31-82			
DRN E.R.	CRD		
APVD			
TITLE		NO	
CAMERA VIDEO PREAMP			CIC-16



COMPUTER IMAGE CORPORATION 2475 W. 2nd AVE DENVER, CO. 80223			
SCALE NONE	REVISIONS	BY	DATE
DATE 3-22-82	PER WCA PRINT	E.R.	5-10-82
DRN E.R.	CKD		
APVD			
TITLE	COLOR CONTROLLER CONTROL PANEL ELECT		NO CIC-W-18

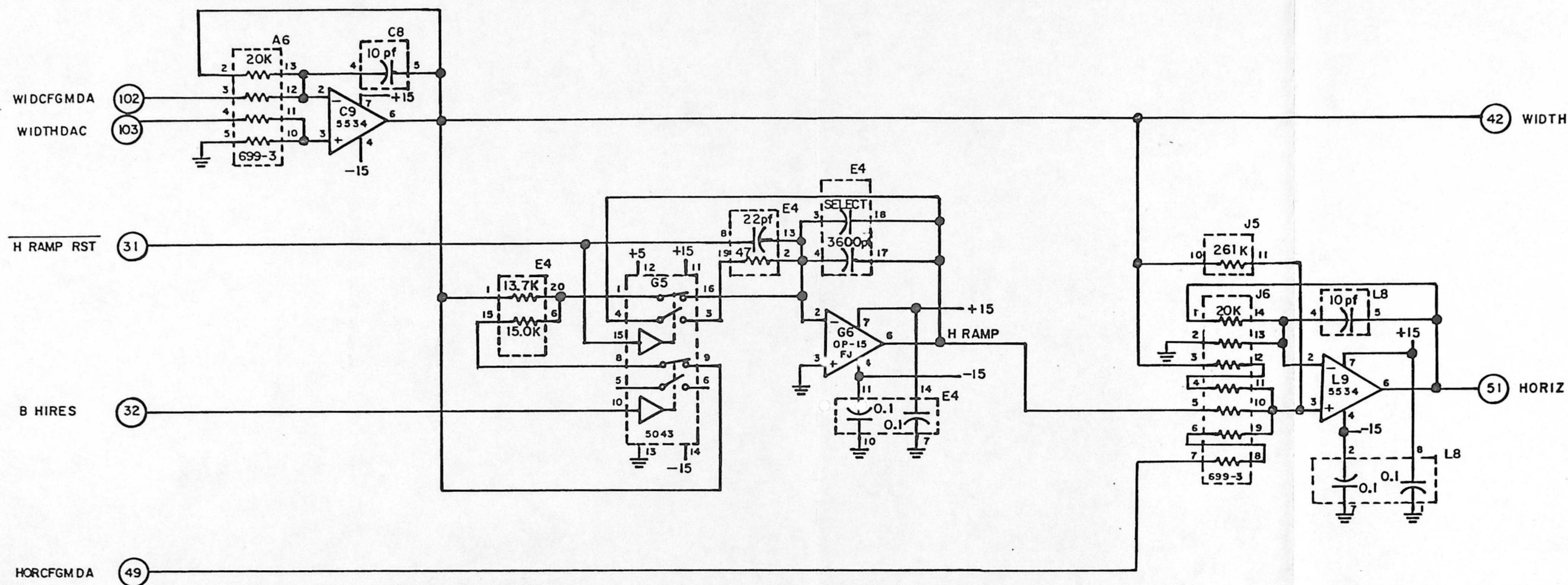


COMPUTER IMAGE CORPORATION 2475 W. 2nd AVE DENVER, CO. 80223			
SCALE NONE	REVISIONS	BY	DATE
DATE 3-17-82	PER WCA MARKED PRINT	E.R.	4-27-82
DRW E.R.	CKD		
APVD			
TITLE	COLOR CONTROLLER LOGIC 2	NO	CIC-W-19



REV: A;

COMPUTER IMAGE CORPORATION 2475 W. 2nd AVE. DENVER, CO. 80223			
SCALE NONE	REVISIONS	BY	DATE
DATE 4-26-82			
DRN ER.	CHKD		
APVD			
TITLE INTENSITY COMPENSATION		NO CIC-W-20 SHEET 2 OF 2	



NOTES:

5534 IS NE 5534 AN OP AMP.

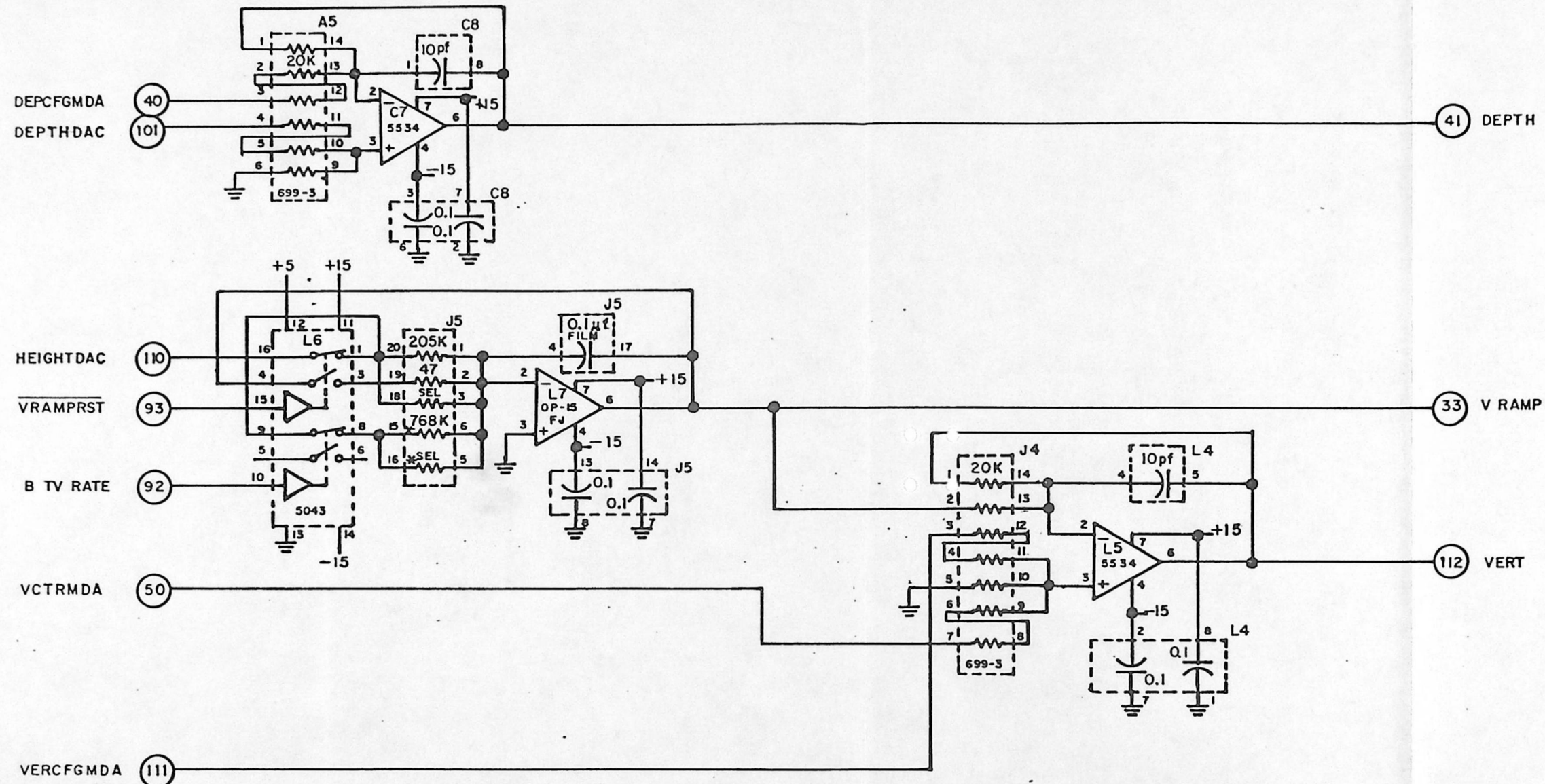
5043 IS HII-5043-5 ANALOG SWITCH.

699-3 IS A 14 PIN DIP WITH 7 IDENTICAL RESISTORS.

694-3 IS A 8 PIN DIP WITH 4 IDENTICAL RESISTORS.

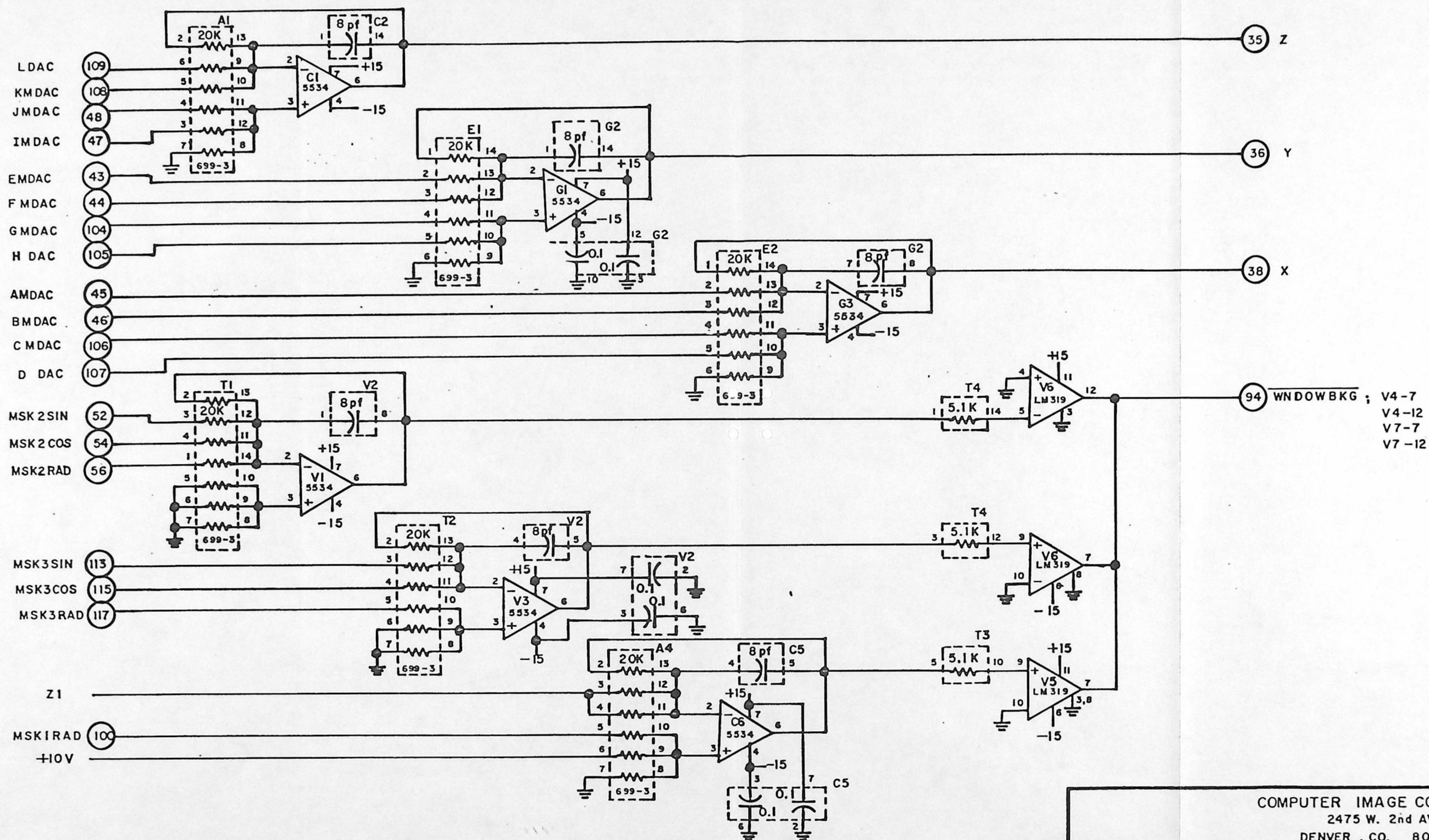
ALL DIODES ARE IN3064 UNLESS OTHERWISE NOTED.

COMPUTER IMAGE CORPORATION				
2475W. 2nd AVE DENVER, CO. 80223				
SCALE NONE	REVISIONS		BY	DATE
DATE 10-28-81	PER WCA. MARKED PRINT		E.R.	3-11
DRW E.R.	VAN. PT.		E.R.	4-15
APVD	PER WCA PRINT (ECN 415)		E.R.	5-10-82
TITLE	SYSTEM IV RASTER GENERATOR		NO CIC-W-21A SHEET 1 OF 4	



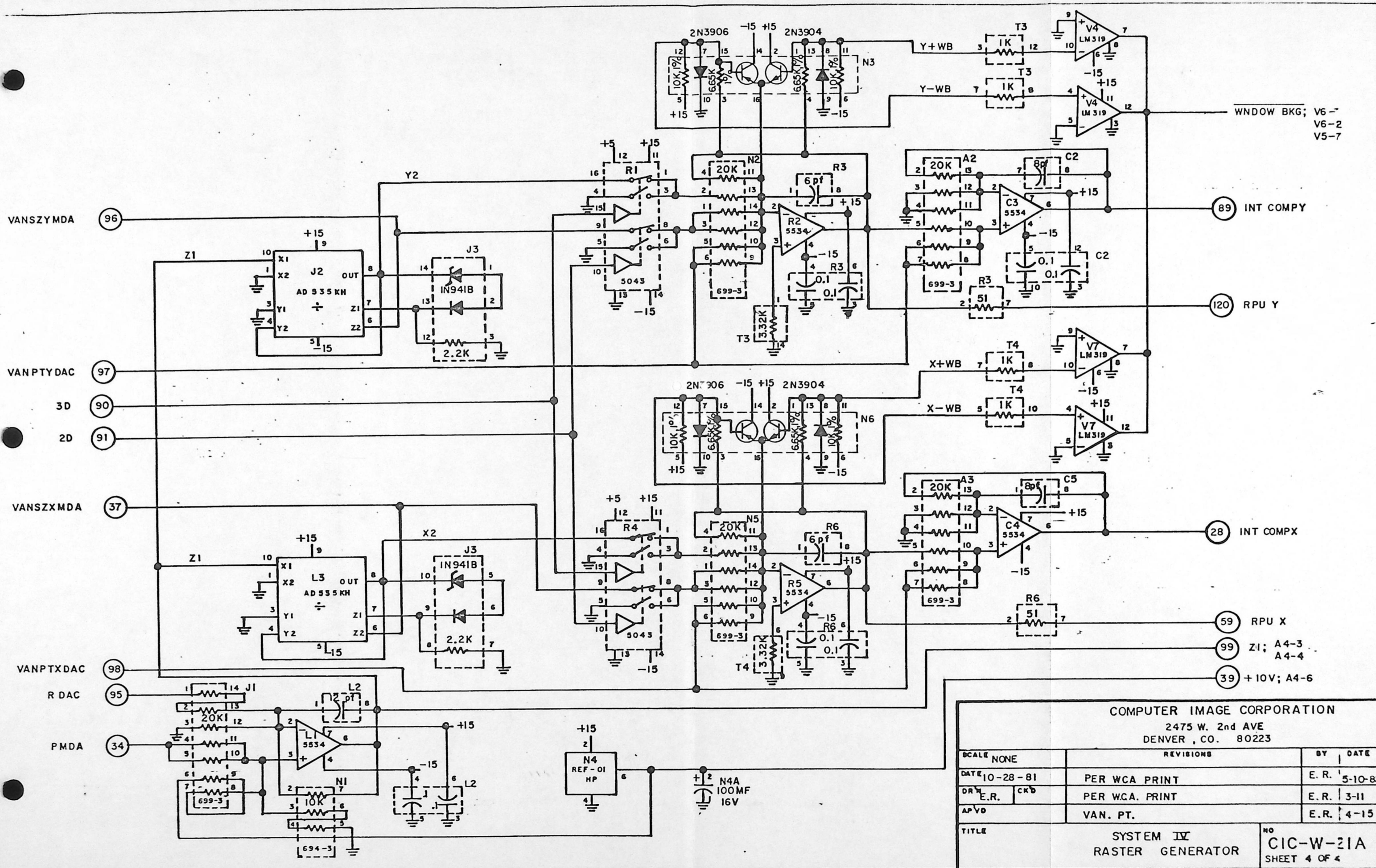
* OMIT FOR PAL

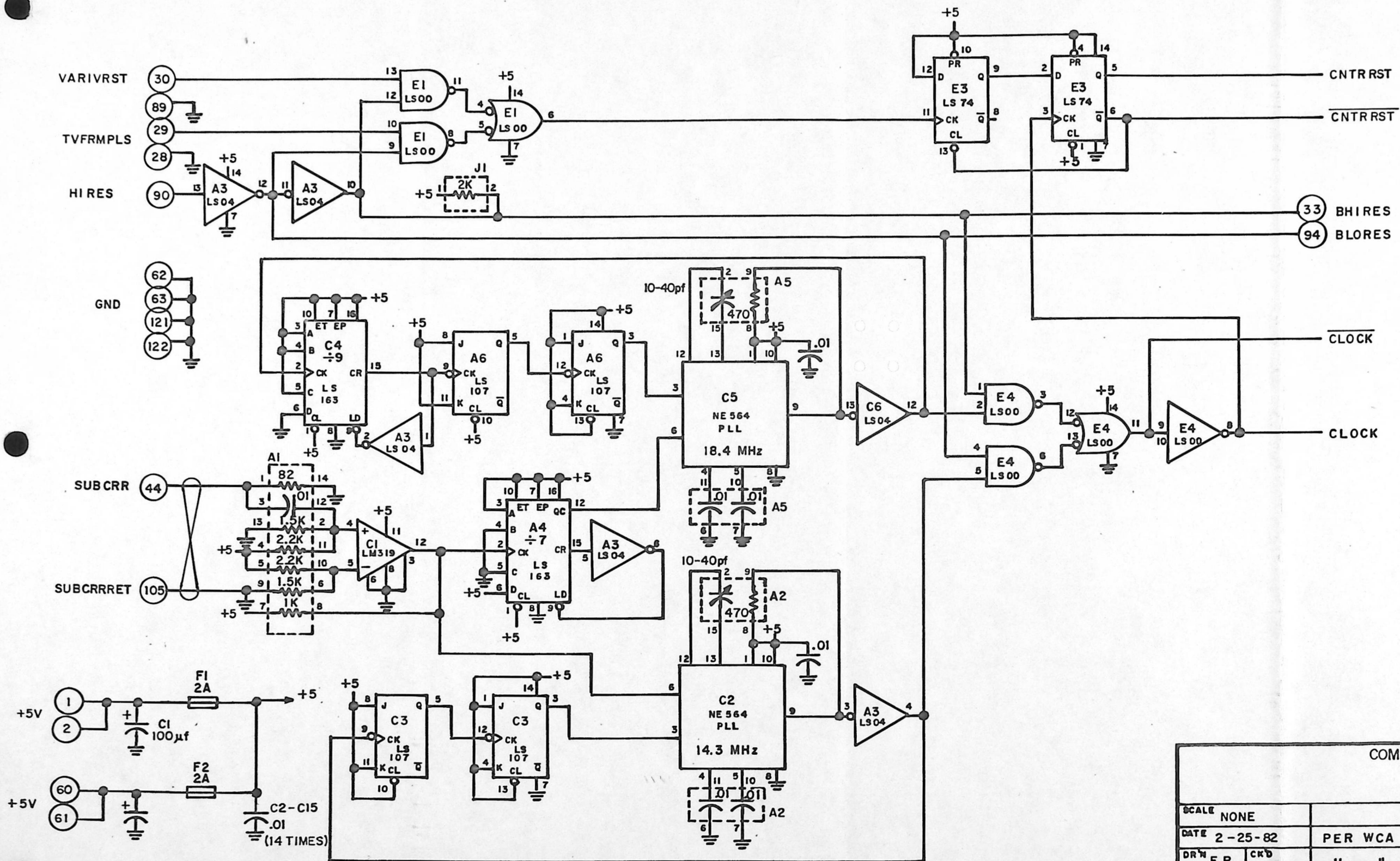
COMPUTER IMAGE CORPORATION			
2475 W. 2nd AVE			
DENVER, CO. 80223			
SCALE NONE	REVISIONS		BY DATE
DATE 10-28-81	PER WCA. PRINT		E.R. 3-11
DRW E.R.	VAN. PT.		E.R. 4-15
APVD	PER WCA PRINT		E.R. 5-10-82
TITLE	SYSTEM IV RASTER GENERATOR		NO CIC-W-21A SHEET 2 OF 4



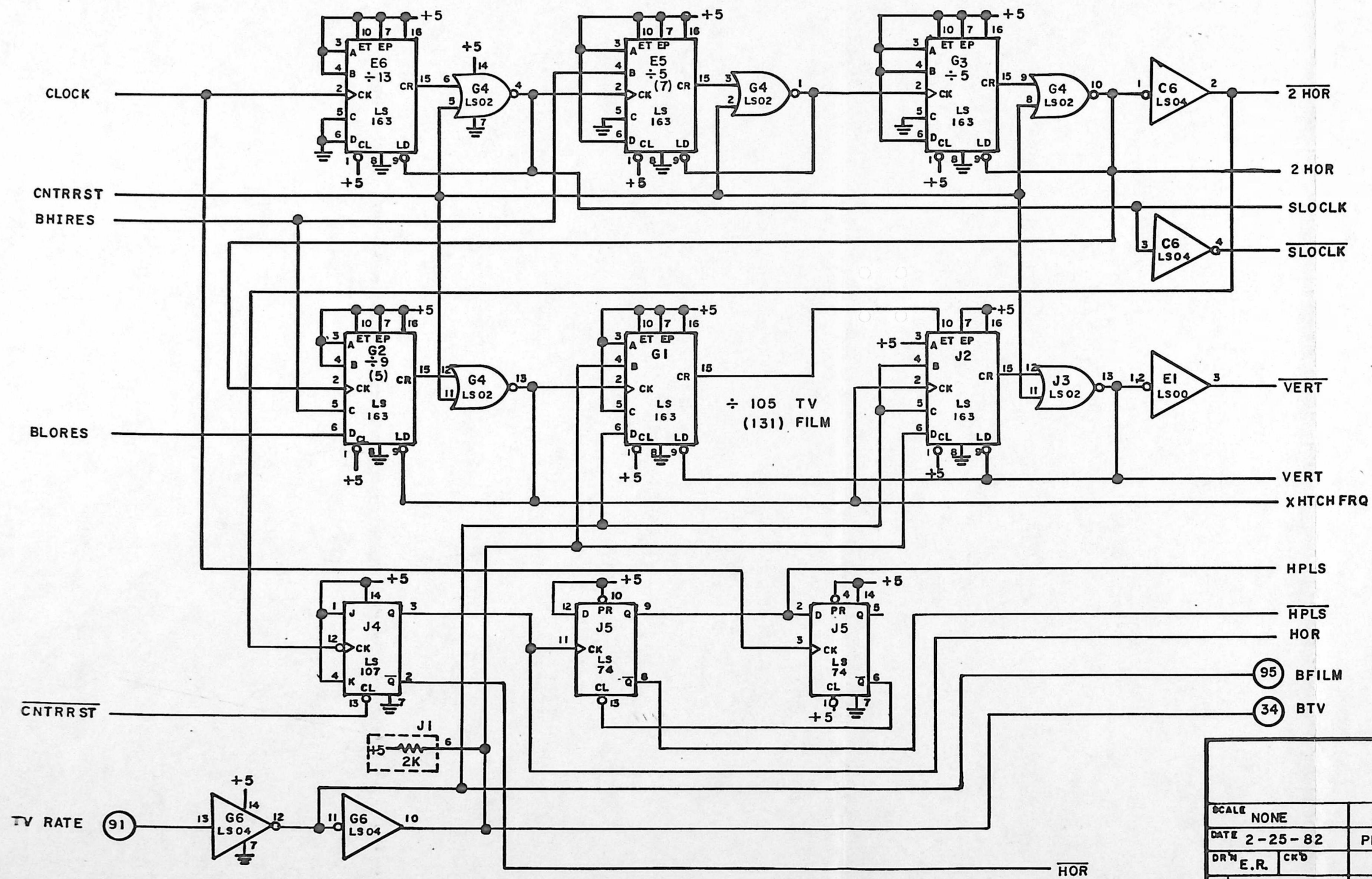
COMPUTER IMAGE CORPORATION
2475 W. 2nd AVE
DENVER, CO. 80223

SCALE		REVISIONS		BY	DATE
NONE					
DATE 10-28-81		VAN. PT.		E.R.	4-15
DRW E.R.		PER WCA PRINT		E.R.	3-10-82
APVD					
TITLE		SYSTEM IV RASTER GENERATOR		NO CIC-W-21A SHEET 3 OF 4	

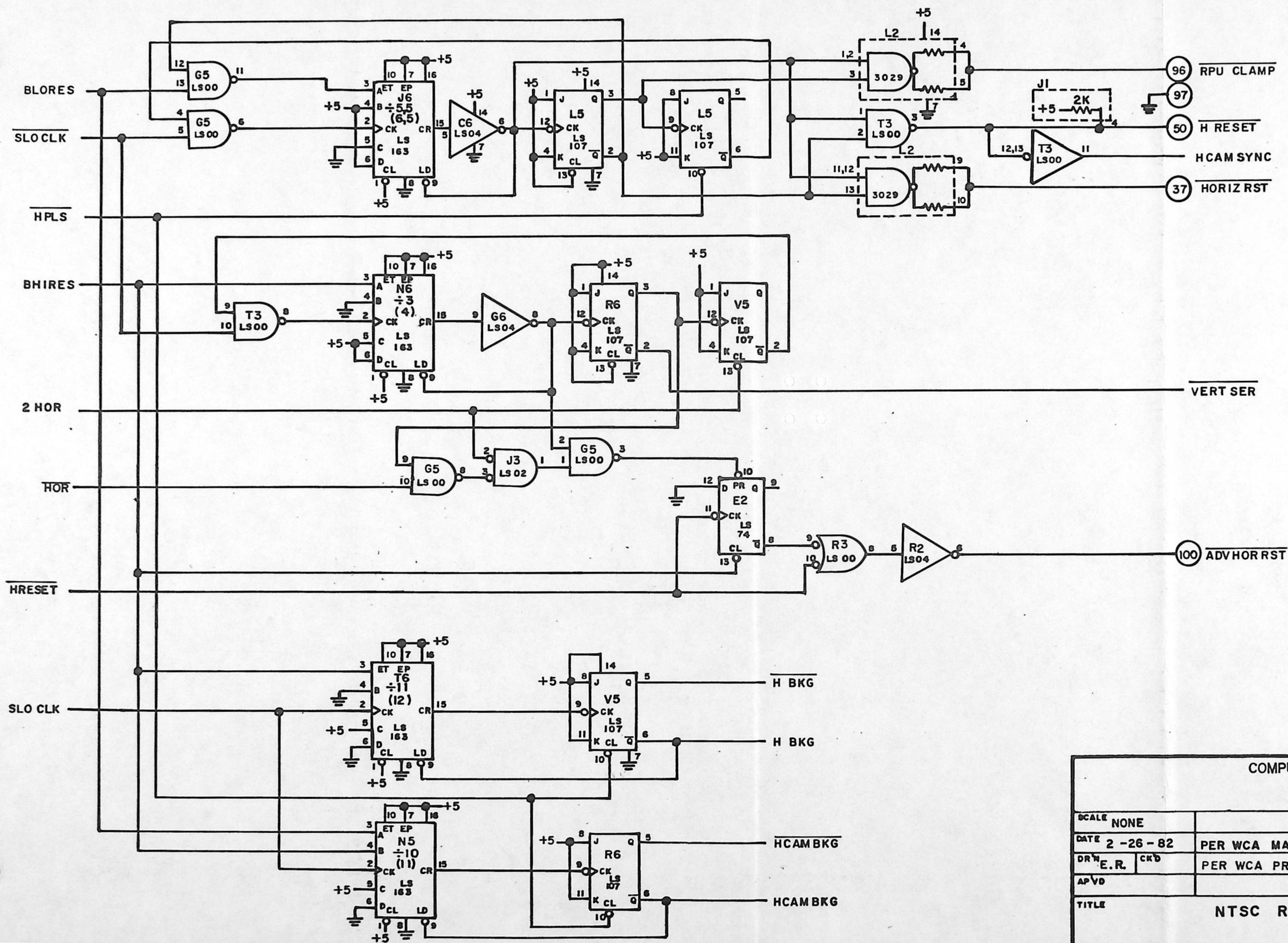




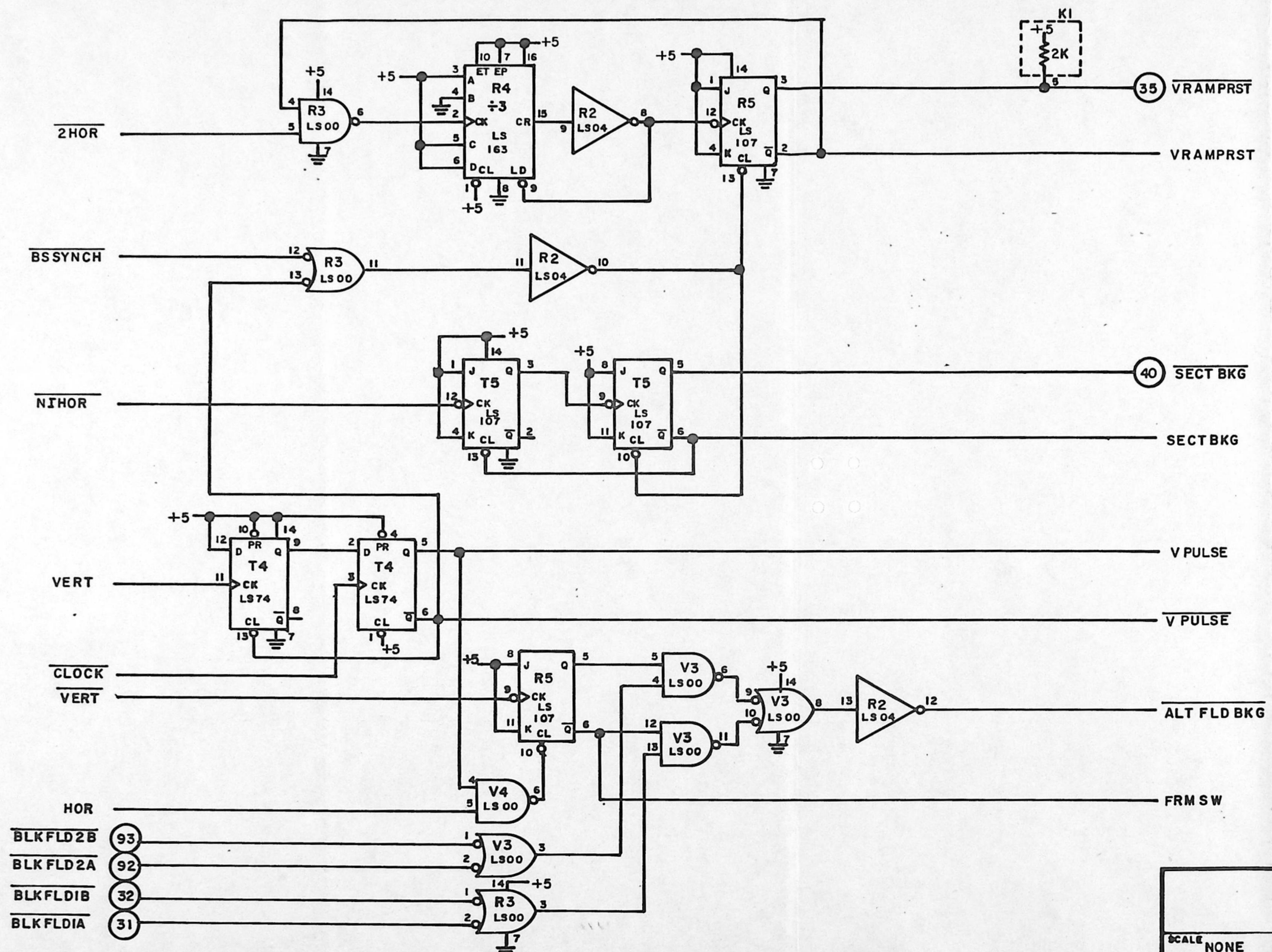
COMPUTER IMAGE CORPORATION 2475 W. 2nd AVE DENVER, CO. 80223			
SCALE NONE	REVISIONS	BY	DATE
DATE 2-25-82	PER WCA MARKED PRINT	E.R.	4-27-82
DRN E.R. CRD	" " " "	E.R.	5-10-82
APVD			
TITLE	NTSC RPU SYNC		NO CIC-W-22 SHEET 1 OF 6



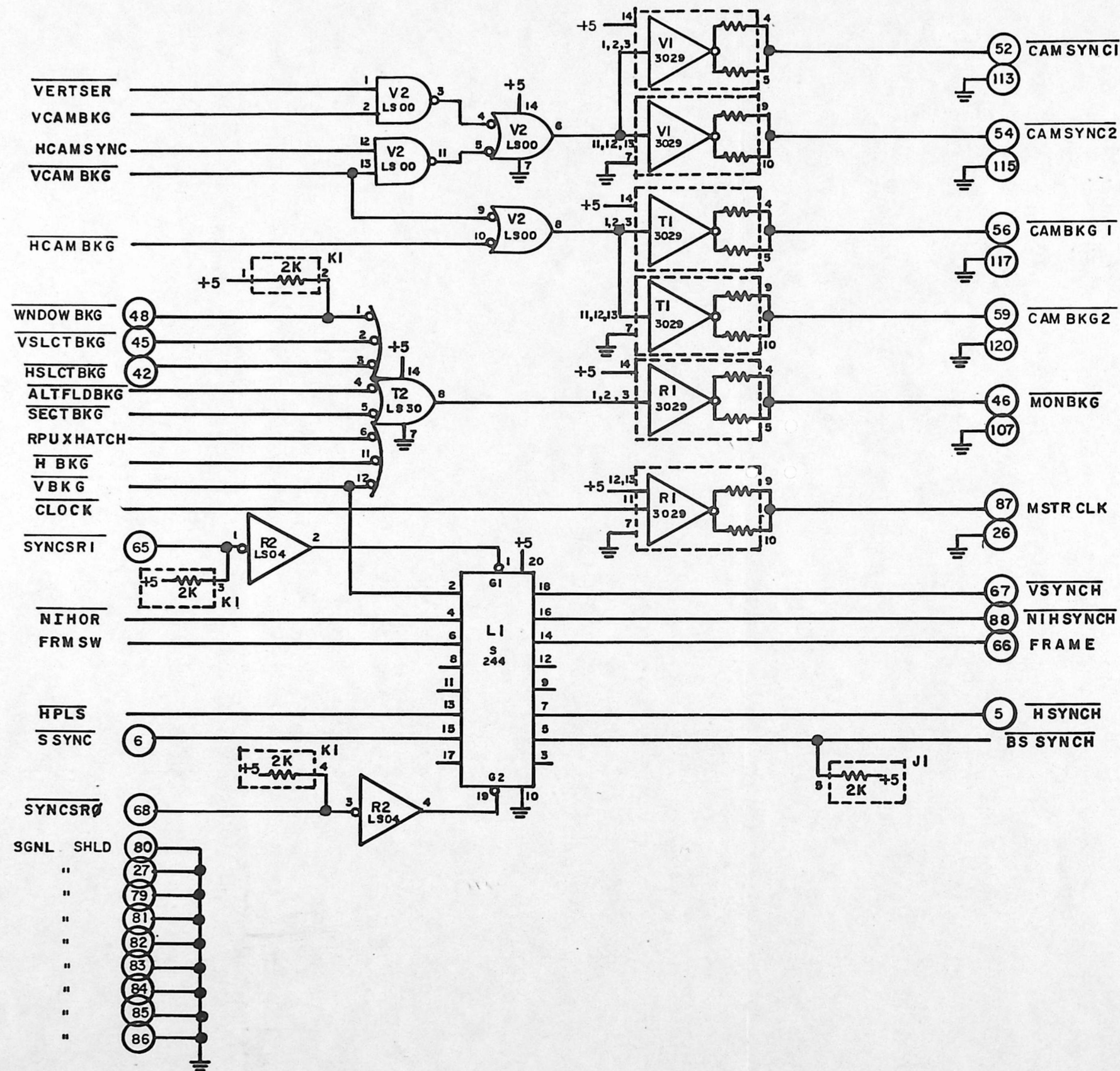
COMPUTER IMAGE CORPORATION 2475 W. 2nd AVE DENVER, CO. 80223			
SCALE NONE	REVISIONS	BY	DATE
DATE 2-25-82	PER WCA MARKED PRINT	E.R.	4-27-82
DRW E.R.	CKD		
APVD			
TITLE	NTSC RPU SYNC		NO
			CIC-W-22
			SHEET 2 OF 6



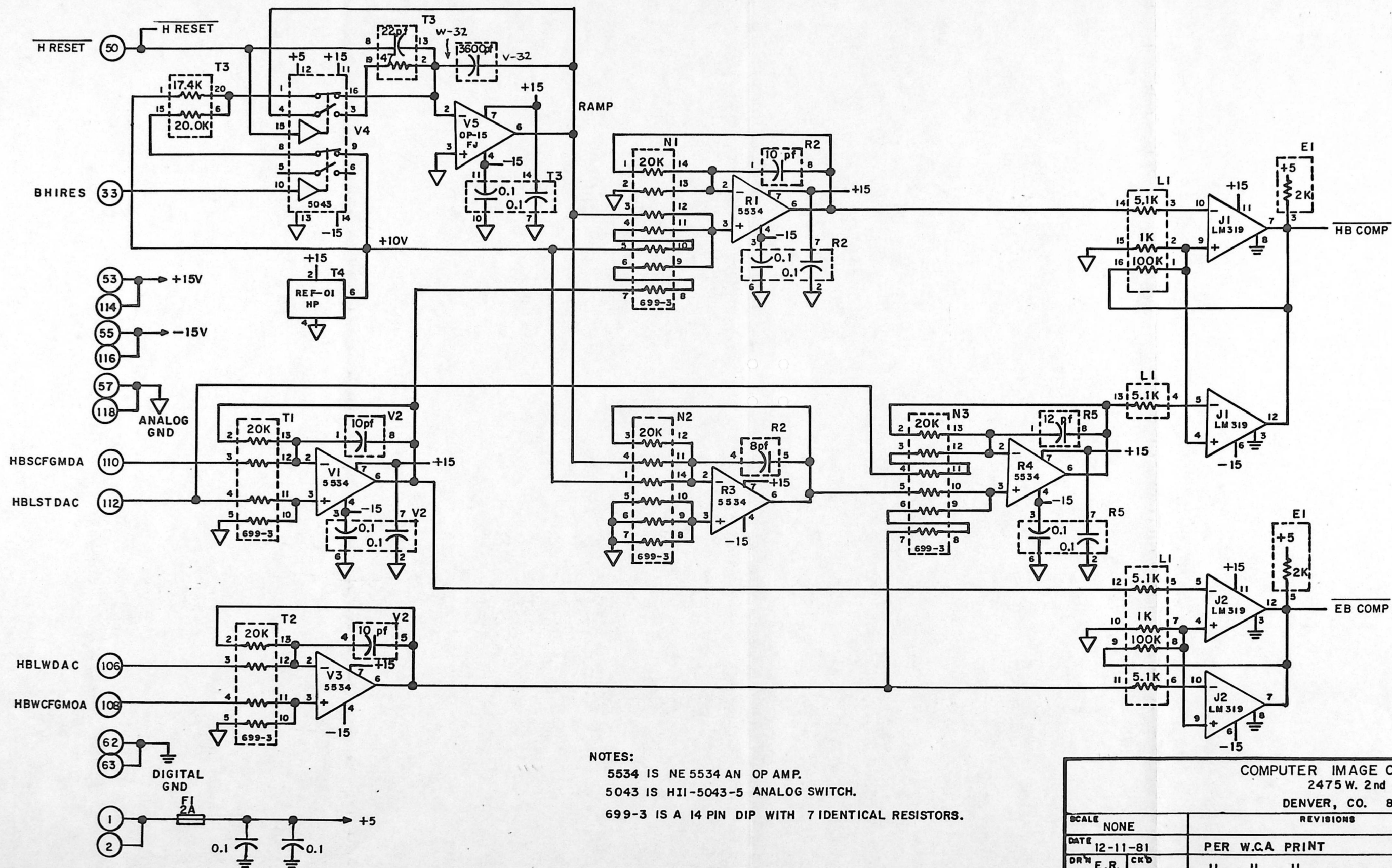
COMPUTER IMAGE CORPORATION			
2475 W. 2nd AVE			
DENVER, CO. 80223			
SCALE NONE	REVISIONS	BY	DATE
DATE 2-26-82	PER WCA MARKED PRINT	E.R.	4-27-82
DRN E.R. CKD	PER WCA PRINT	E.R.	5-10-82
APVD			
TITLE		NTSC RPU SYNC	
		NO	
		CIC-W-22	
		SHEET 3 OF 6	



COMPUTER IMAGE CORPORATION 2475 W. 2nd AVE DENVER, CO. 80223			
SCALE NONE	REVISIONS	BY	DATE
DATE 2-27-82	PER WCA MARKED PRINT	E.R.	4-27-82
DRW E.R.	CKD		
APVD			
TITLE	NTSC RPU SYNC		NO
			CIC-W-22
			SHEET 5 OF 6

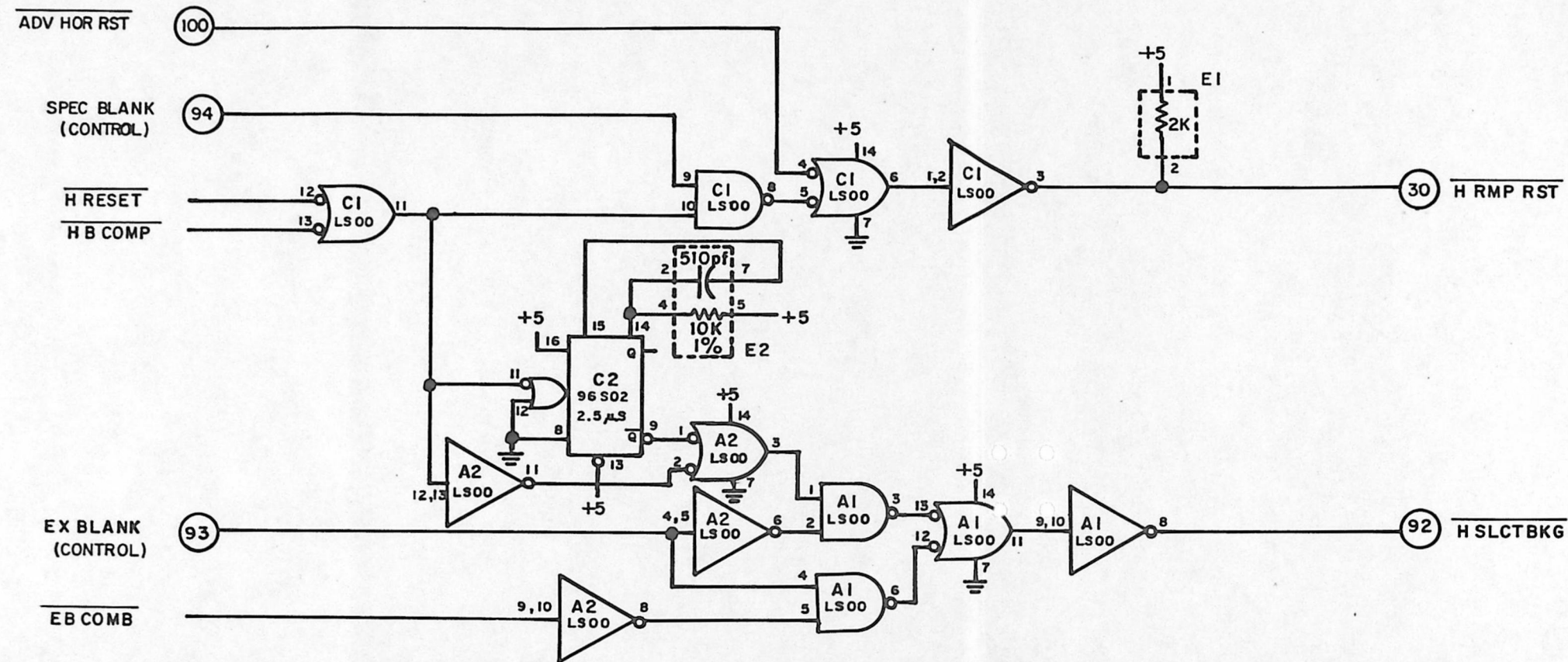


COMPUTER IMAGE CORPORATION 2475 W. 2nd AVE DENVER, CO. 80223			
SCALE NONE	REVISIONS	BY	DATE
DATE 2-27-82	PER WCA MARKED	E.R.	4-27-82
DRN E.R.	CRD		
APVD			
TITLE NTSC RPU SYNC		NO CIC-W-22 SHEET 6 OF 6	

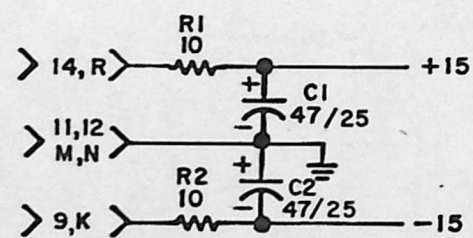
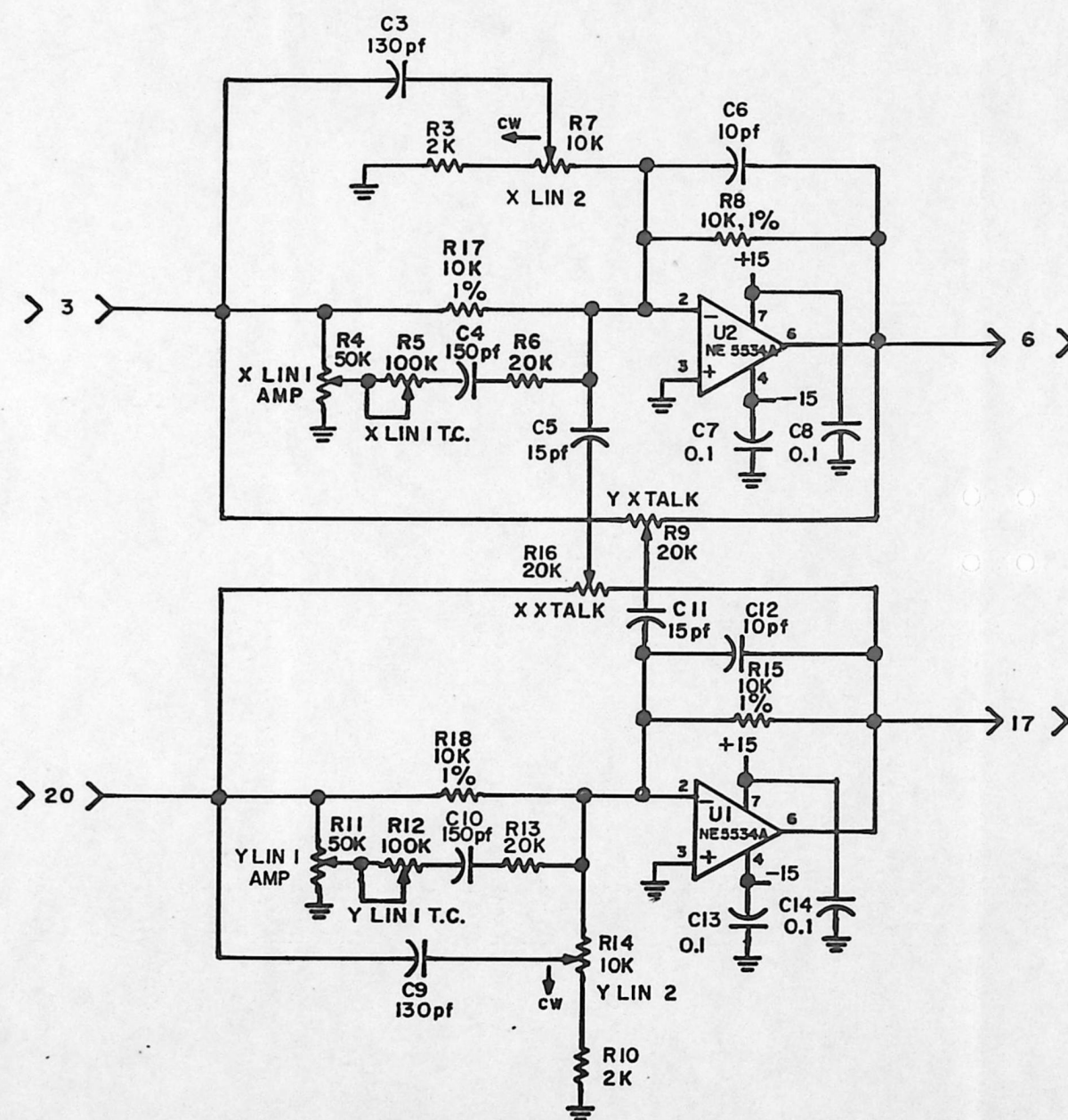


NOTES:
 5534 IS NE 5534 AN OP AMP.
 5043 IS H11-5043-5 ANALOG SWITCH.
 699-3 IS A 14 PIN DIP WITH 7 IDENTICAL RESISTORS.

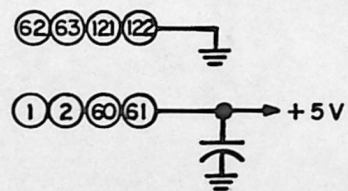
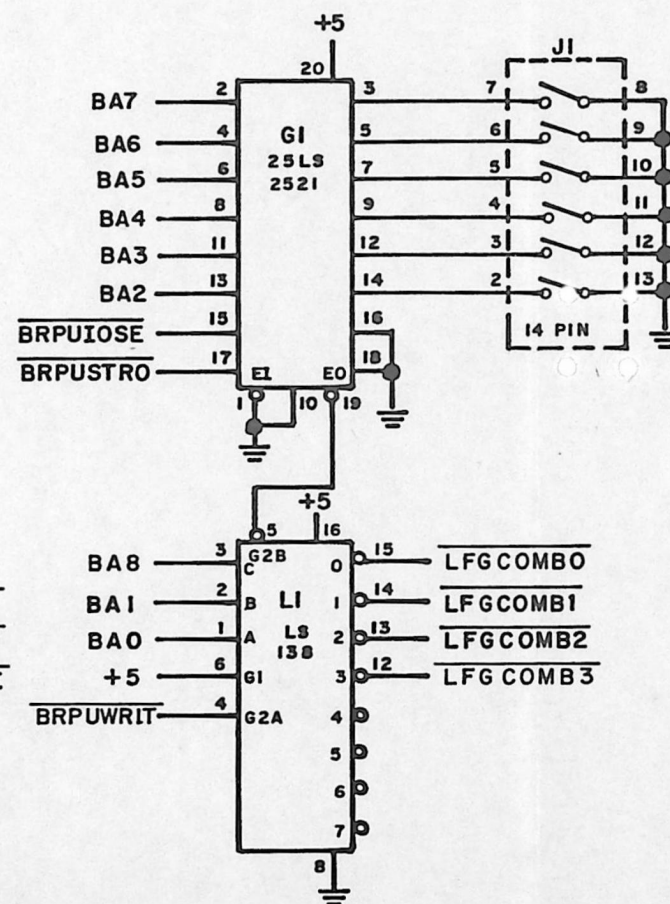
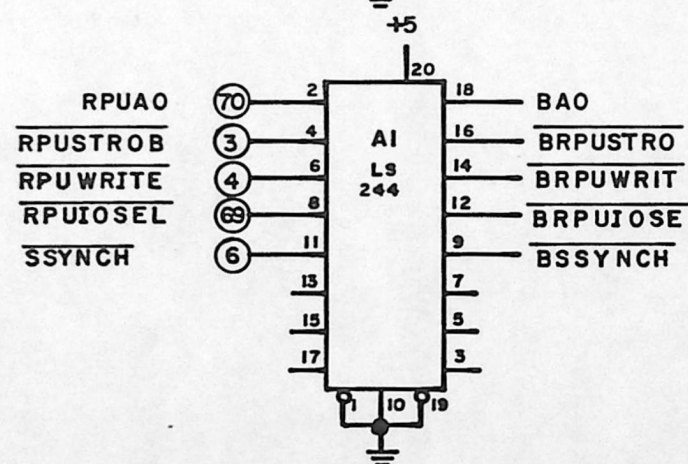
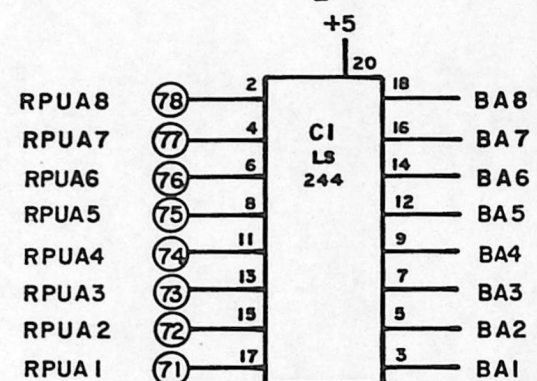
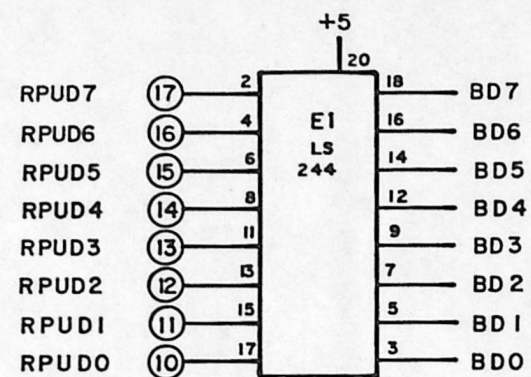
COMPUTER IMAGE CORPORATION 2475 W. 2nd AVE DENVER, CO. 80223			
SCALE NONE	REVISIONS	BY	DATE
DATE 12-11-81	PER W.C.A. PRINT	E.R.	3-11
DRW E.R.	CKD	"	"
APVD		E.R.	5-10-82
TITLE SYSTEM IV HORIZONTAL BLANKING		NO CIC-W-23 SHEET 1 OF 2	



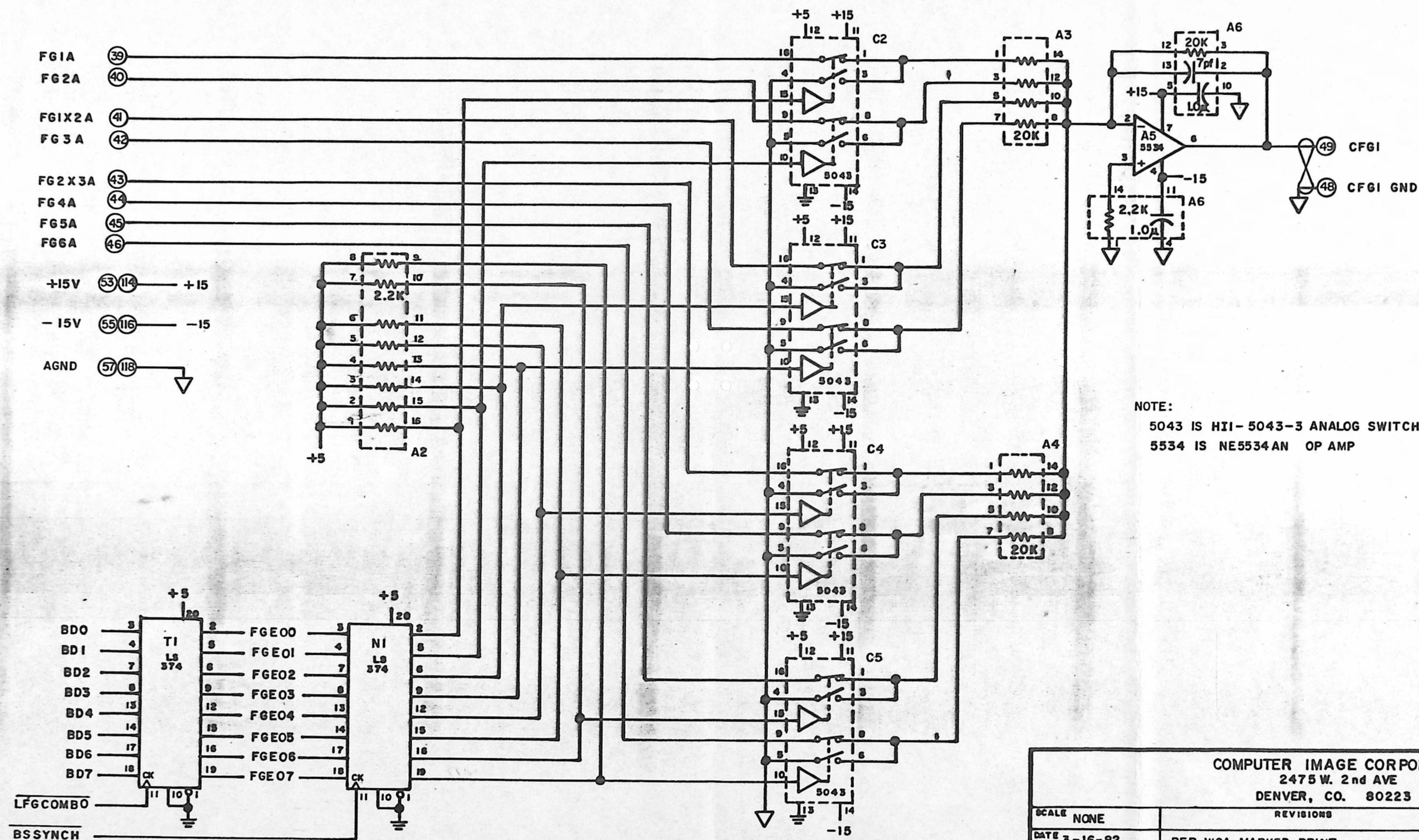
COMPUTER IMAGE CORPORATION			
2475 W. 2nd AVE			
DENVER, CO. 80223			
SCALE NONE	REVISIONS	BY	DATE
DATE 12-11-81	PER WCA MARKED PRINT	E.R.	4-27-82
DRN E.R.	CKD		
APVD			
TITLE	SYSTEM IV HORIZONTAL BLANKING		NO CIC-W-23 SHEET 2 OF 2



COMPUTER IMAGE CORPORATION 2475 W. 2nd AVE DENVER, CO. 80223			
SCALE NONE	REVISIONS	BY	DATE
DATE 3-22-82	PER WCA MARKED PRINT	E.R.	4-27-82
DRN E.R.	CRD		
APVD			
TITLE OVERLAP YOKE COMP		NO CIC-W-24	

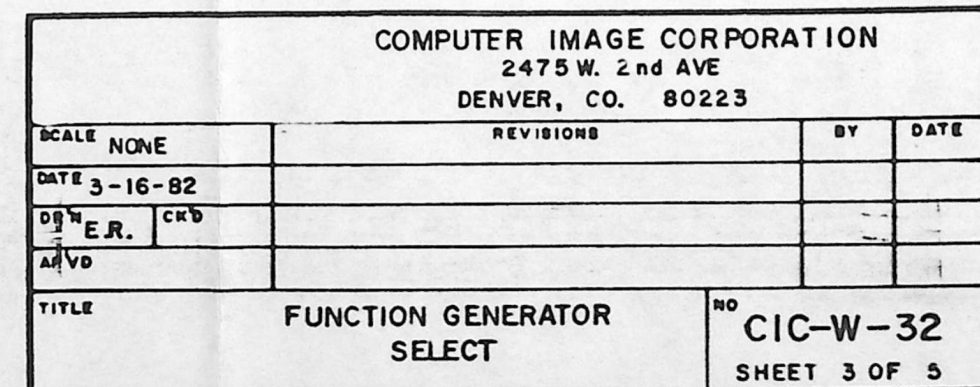


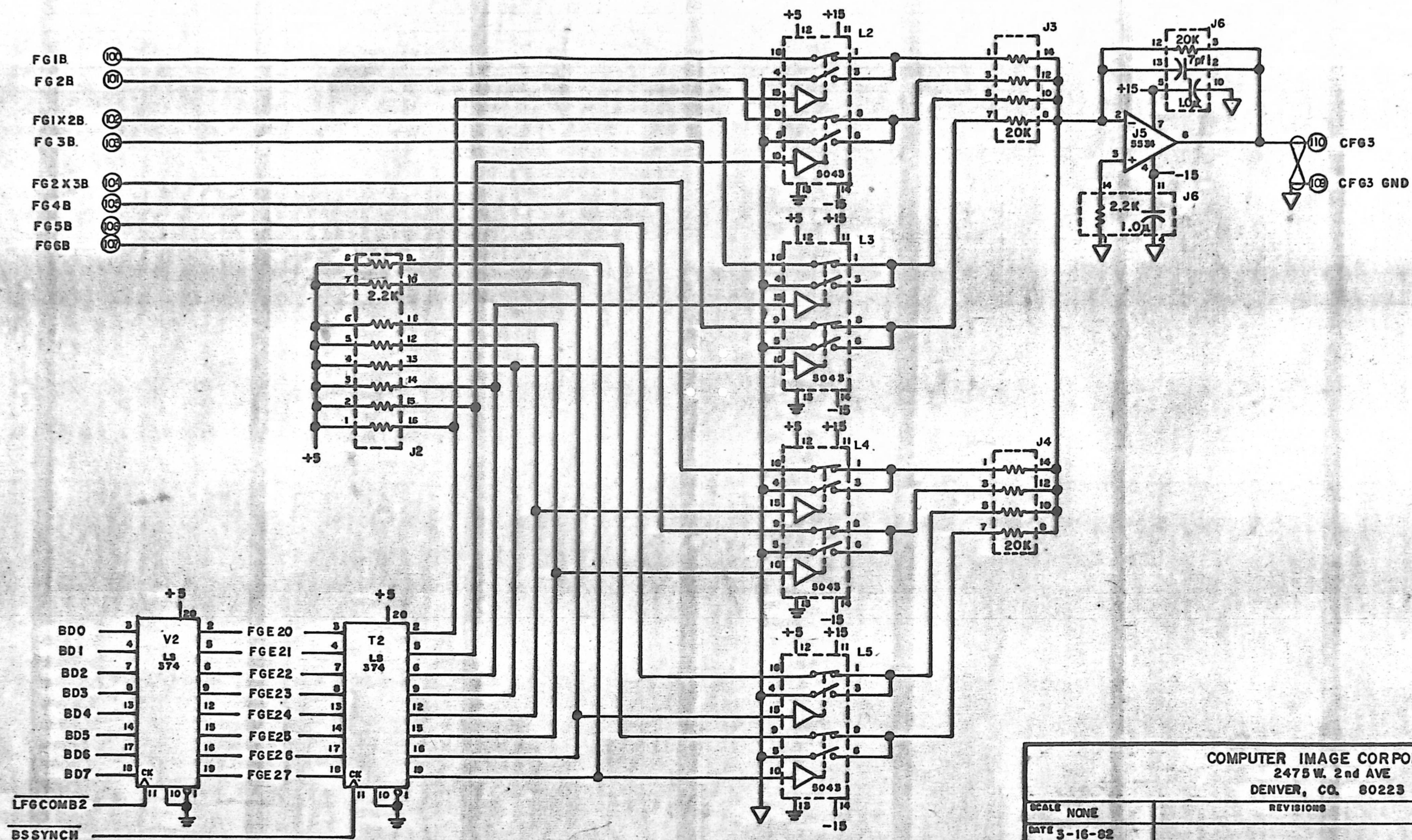
COMPUTER IMAGE CORPORATION 2475W. 2nd AVE DENVER, CO. 80223			
SCALE NONE	REVISIONS	BY	DATE
DATE 3-16-82			
DRN E.R.	CRD		
APVD			
TITLE FUNCTION GENERATOR SELECT		NO CIC-W-32 SHEET 1 OF 5	



COMPUTER IMAGE CORPORATION
2475 W. 2nd AVE
DENVER, CO. 80223

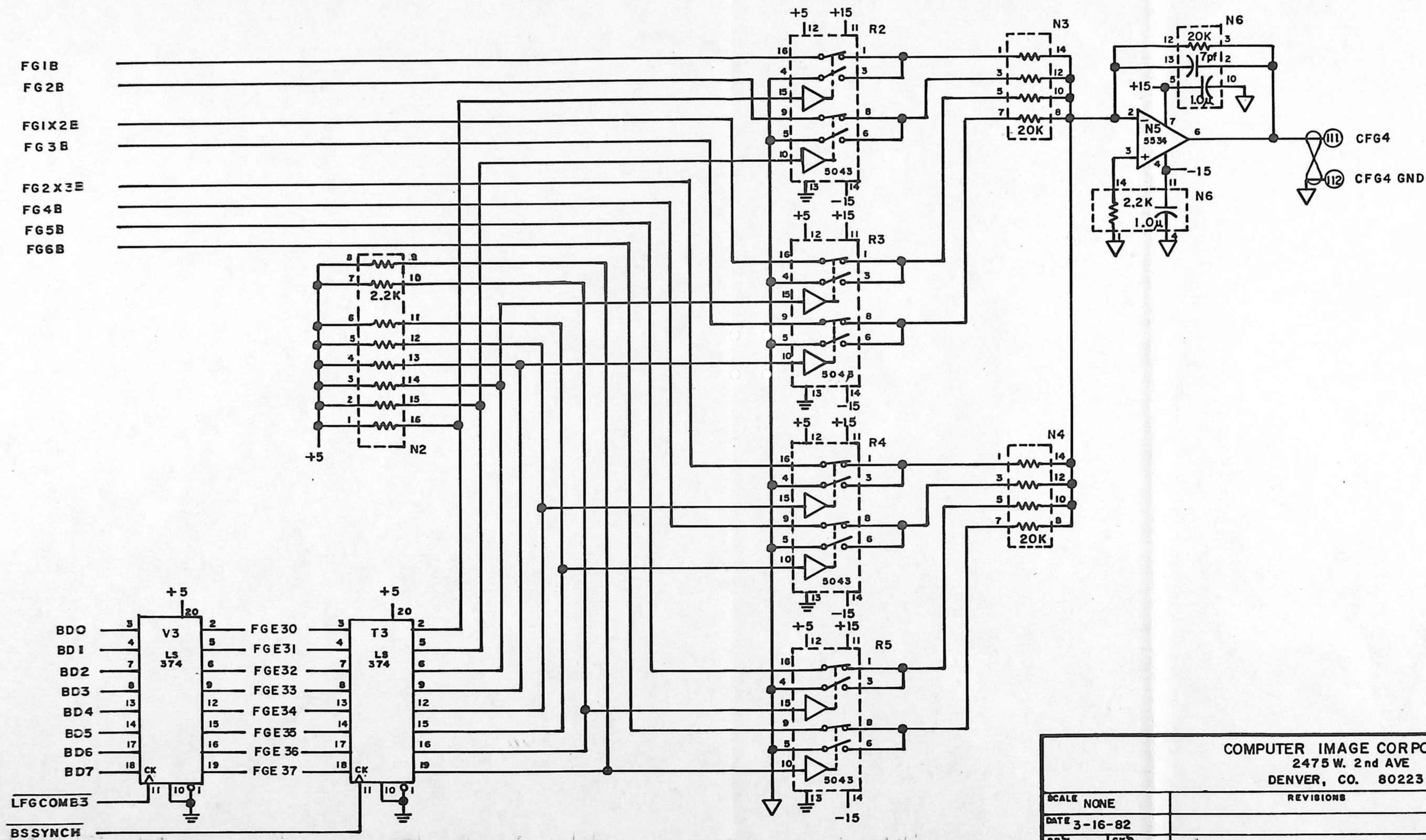
SCALE NONE	REVISIONS	BY	DATE
DATE 3-16-82	PER WCA MARKED PRINT	E.R.	4-27-82
DRN E.R.	CRD		
APVD			
TITLE	FUNCTION GENERATOR SELECT		
	NO CIC-W-32 SHEET 2 OF 5		



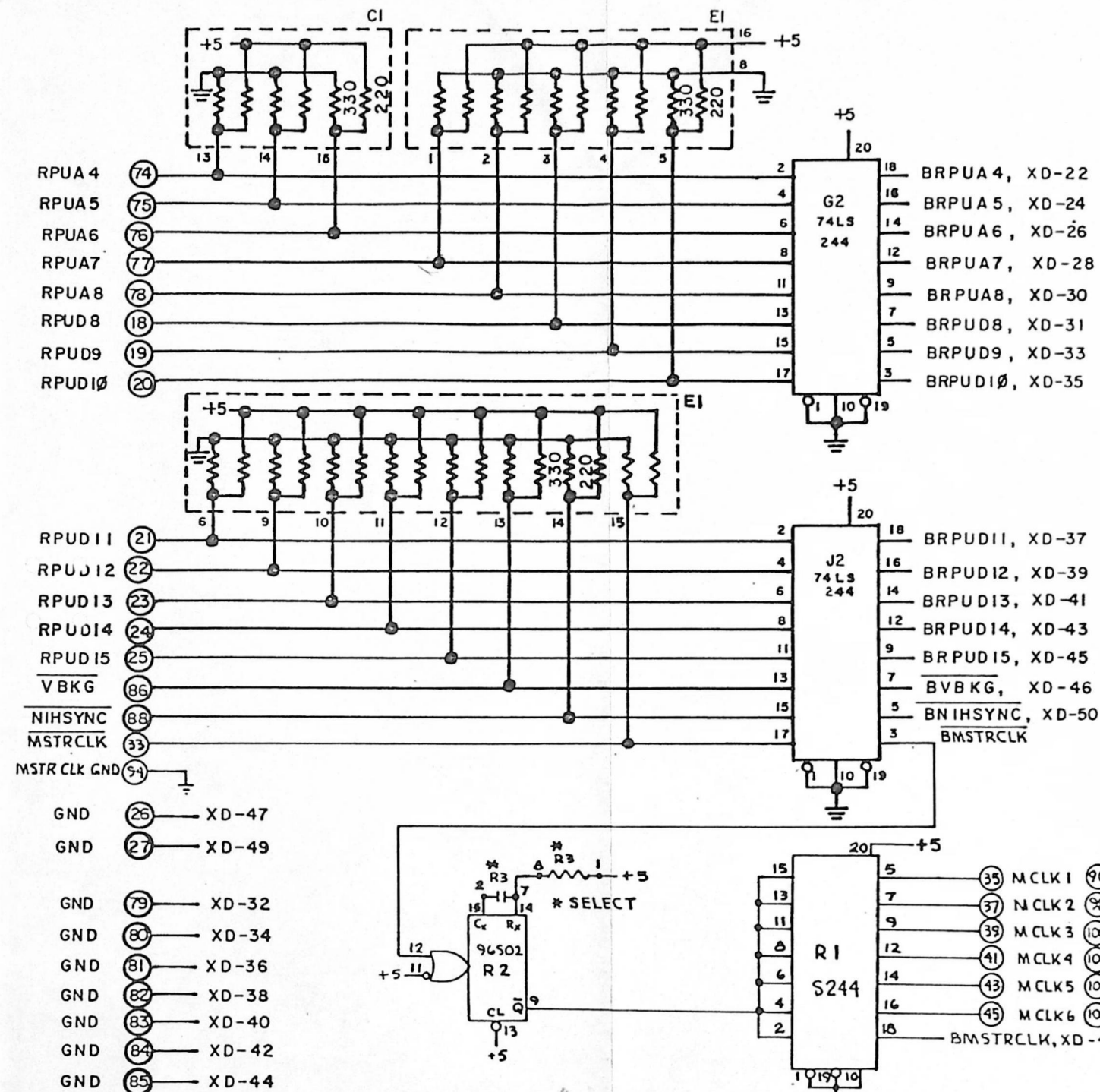
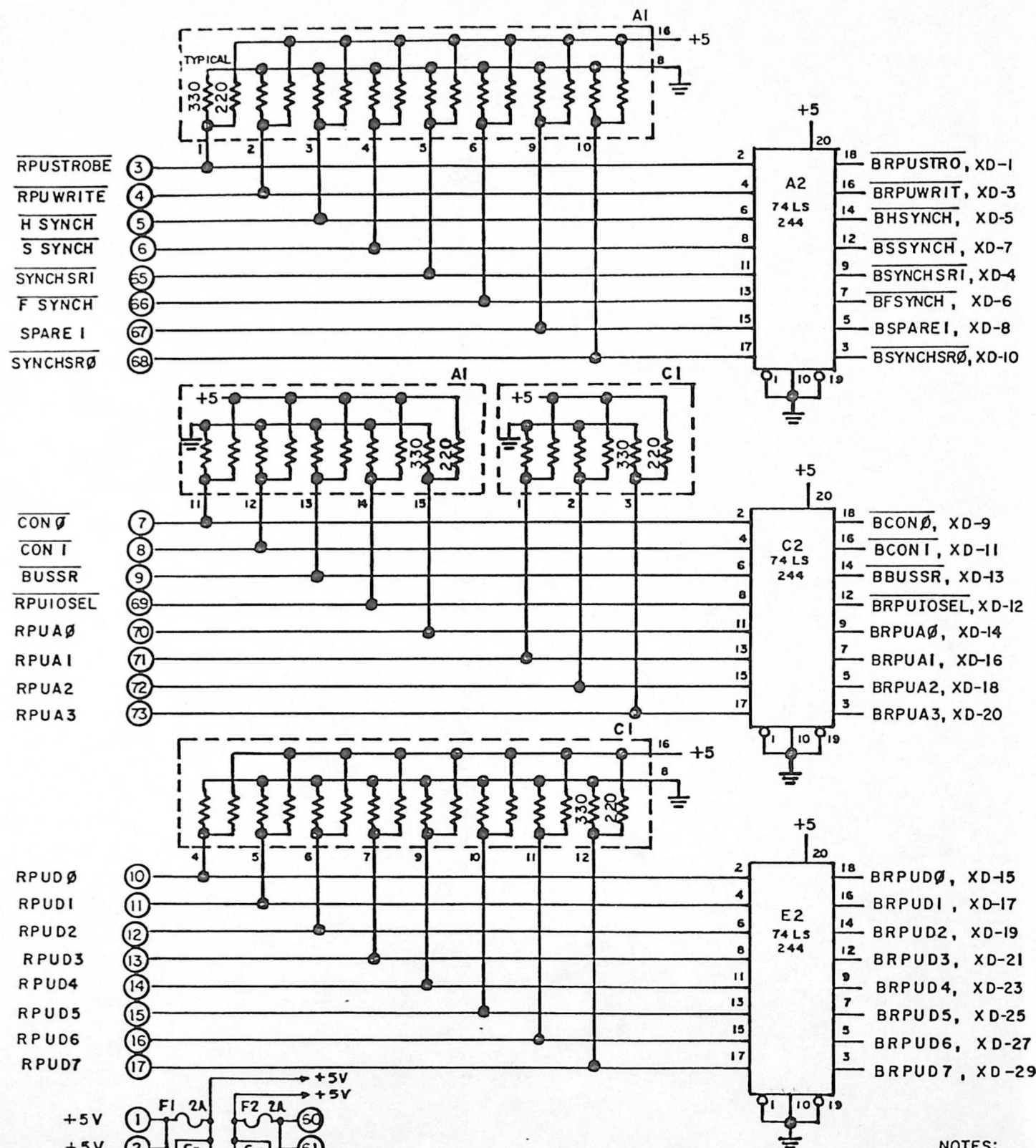


COMPUTER IMAGE CORPORATION
2475 W. 2nd AVE
DENVER, CO. 80223

SCALE	REVISIONS	BY	DATE
NONE			
DATE 3-16-82			
DRW E.R. CRD			
APVD			
TITLE	FUNCTION GENERATOR SELECT		
	CIC-W-32 SHEET 4 OF 5		



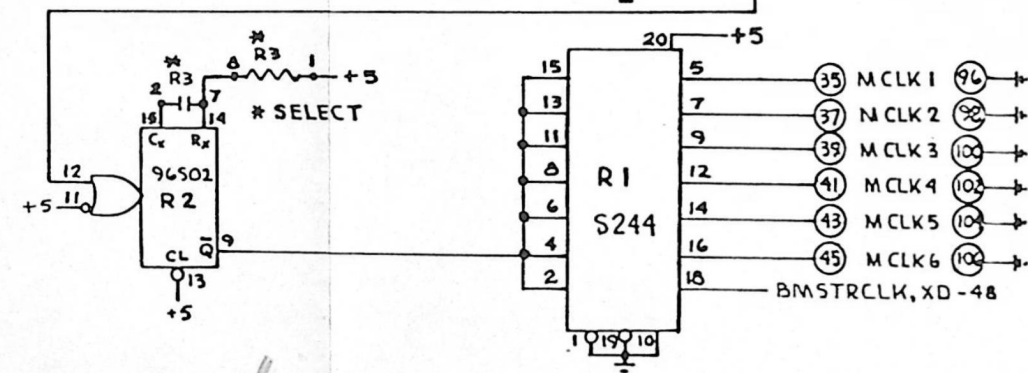
COMPUTER IMAGE CORPORATION 2475 W. 2nd AVE DENVER, CO. 80223			
SCALE NONE	REVISIONS	BY	DATE
DATE 3-16-82			
DRY E.R. CRD.			
APVD			
TITLE	FUNCTION GENERATOR SELECT		NO CIC-W-32 SHEET 5 OF 5



NOTES:

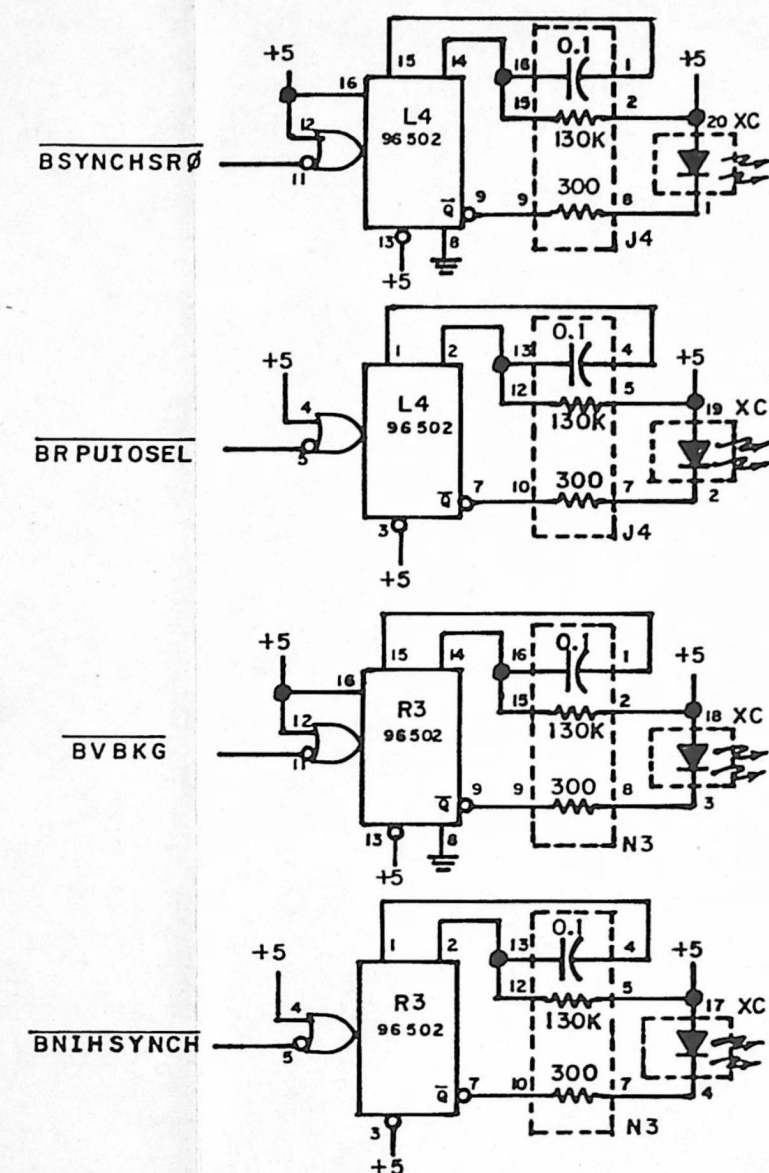
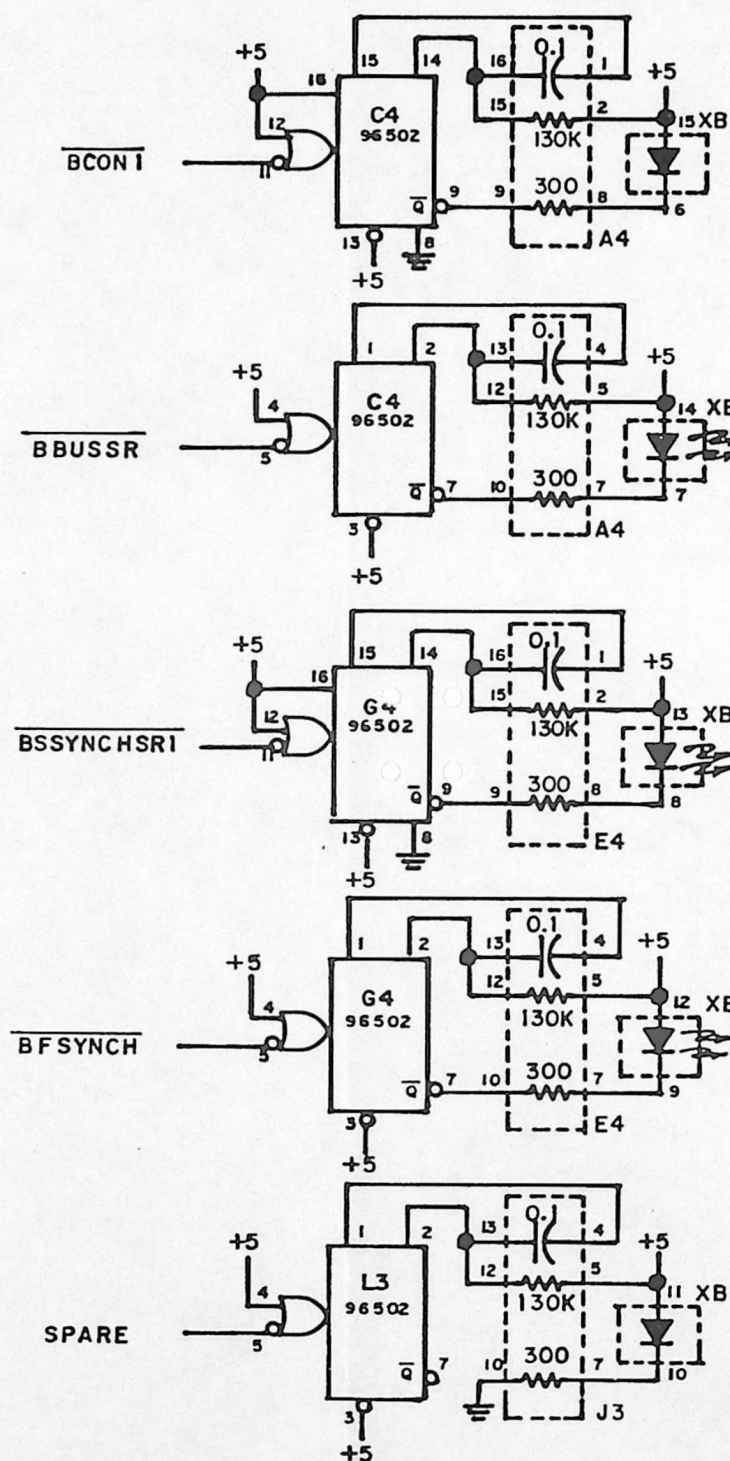
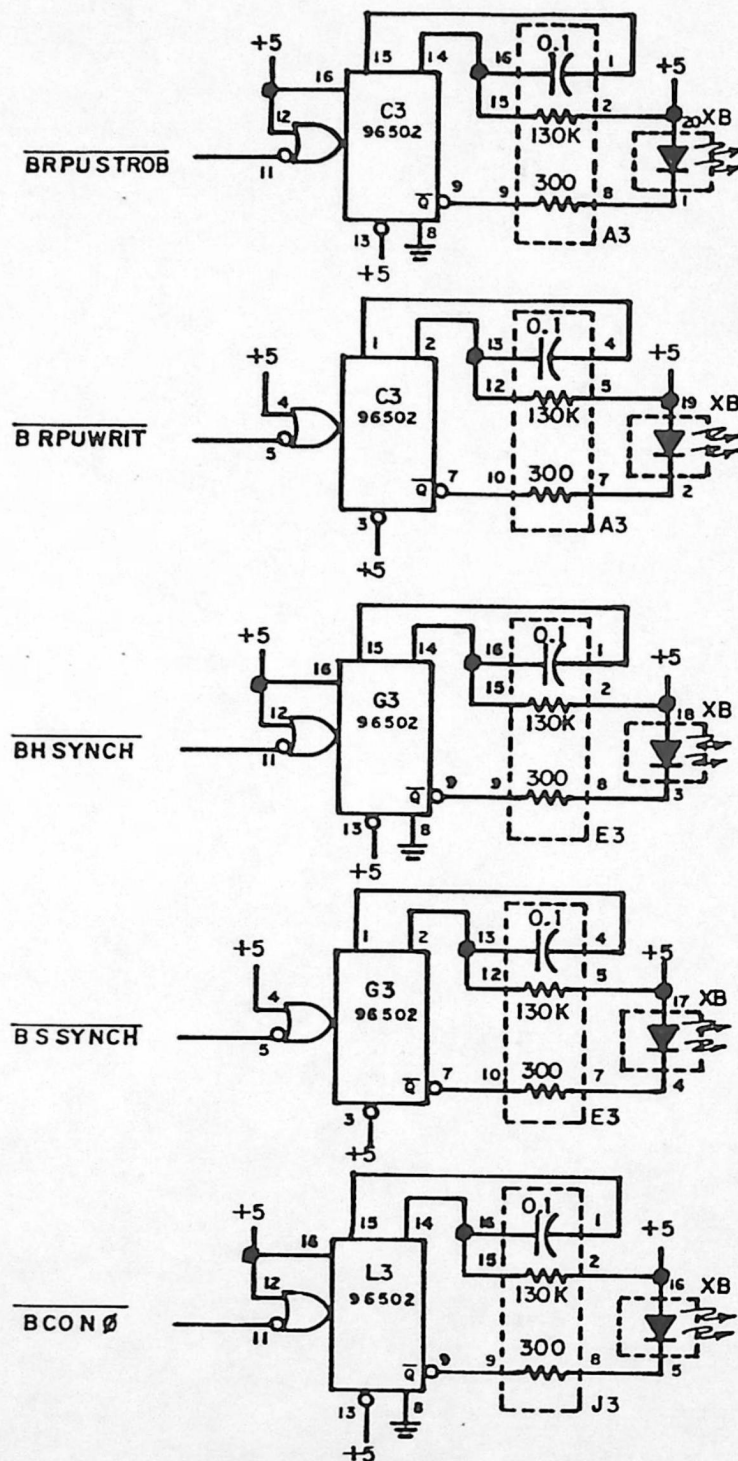
AI, CI, EI ARE 220Ω/330Ω RESISTOR DIPs
 CTS # 761-5-R220/330 OR EQUIVALENT

XC & XB ARE MV57164



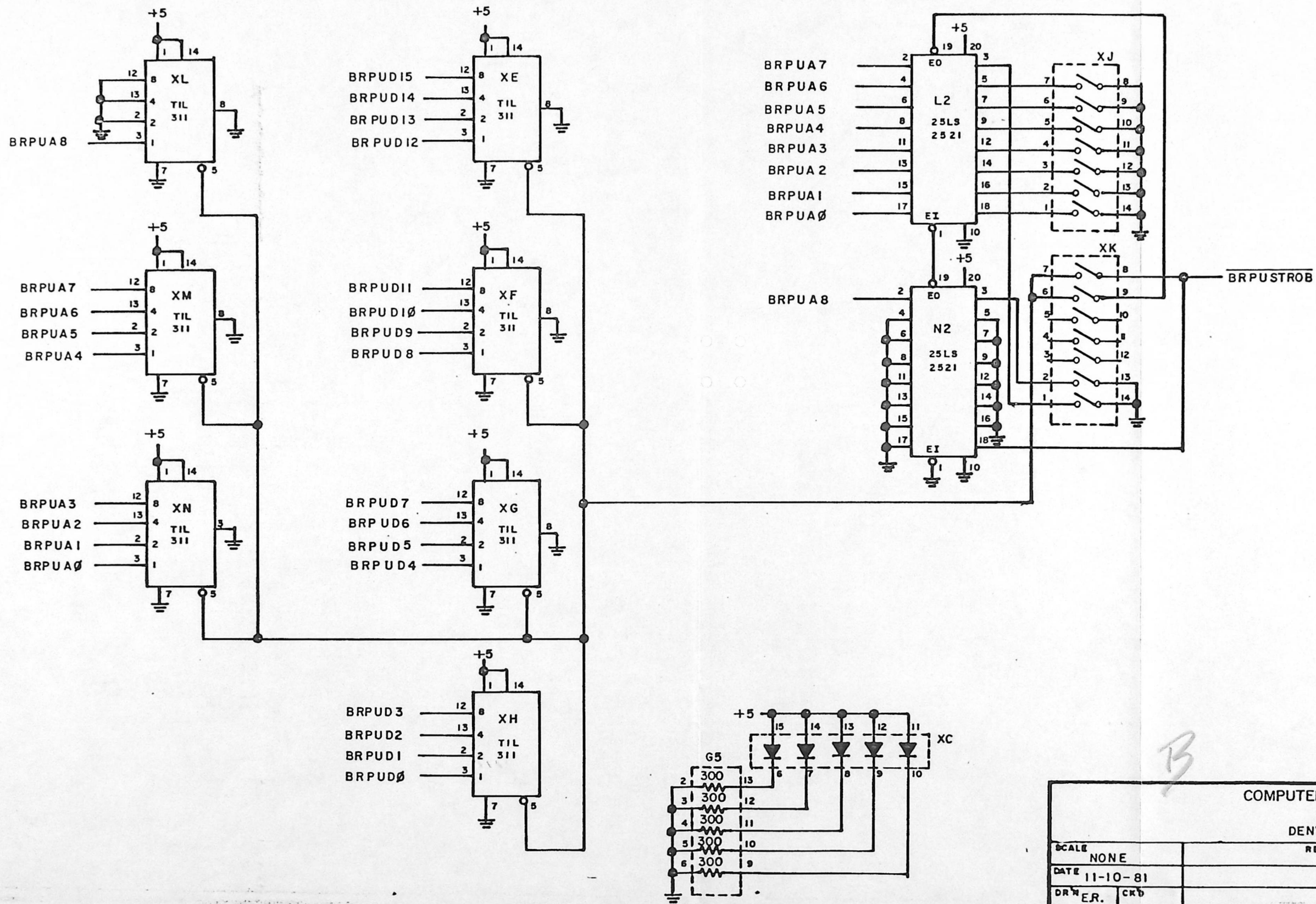
REV: A;B;C;

COMPUTER IMAGE CORPORATION 2475 W. 2nd AVE DENVER, CO. 80223			
SCALE NONE	REVISIONS	BY	DATE
DATE 11-6-81			
DRW E.R.	CKD		
APVD			
TITLE SYSTEM IV DIGITAL BUS TERMINATOR		NO CIC-W-33B SHEET 1 OF 4	



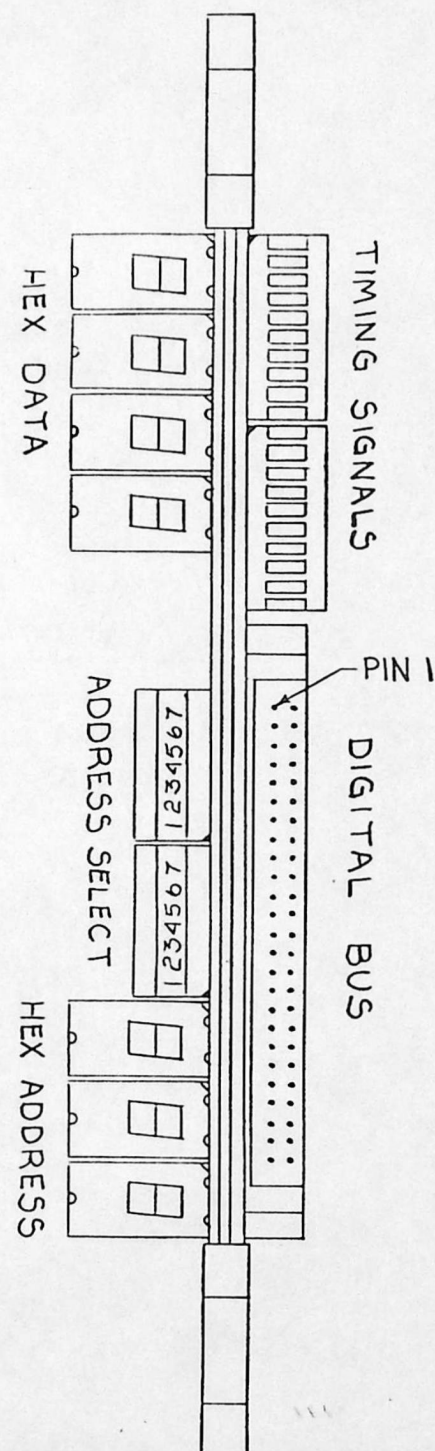
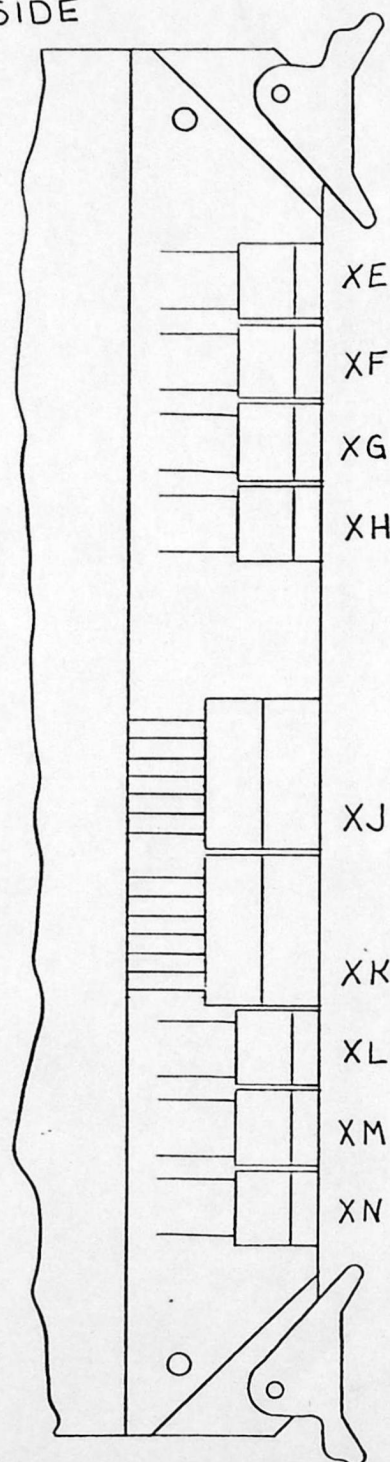
REV: A; B;

COMPUTER IMAGE CORPORATION 2475W. 2nd AVE DENVER, CO. 80223			
SCALE NONE	REVISIONS	BY	DATE
DATE 11-6-81			
DR E.R. CKD			
APVD			
TITLE	SYSTEM IV DIGITAL BUS TERMINATOR		NO CIC-W-33A SHEET 2 OF 3

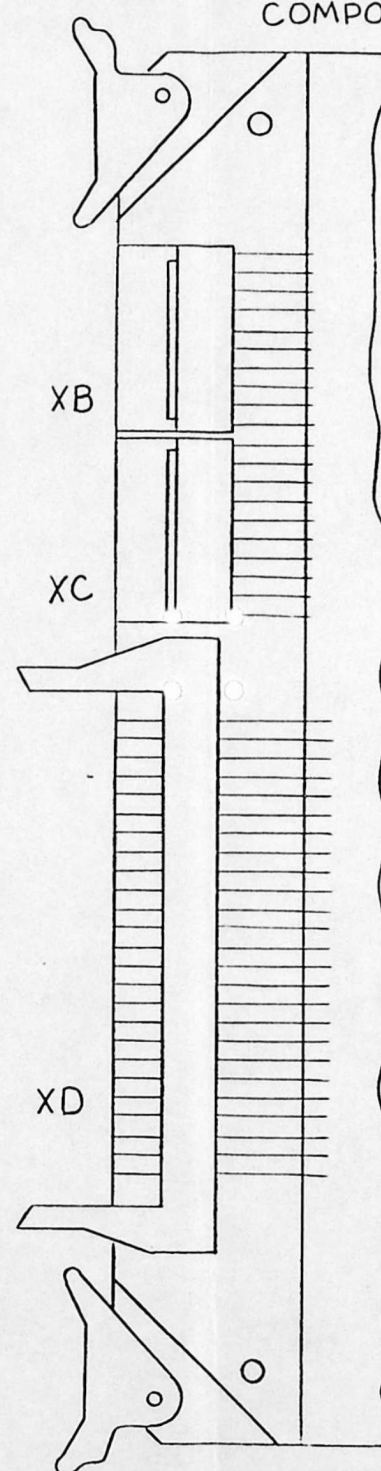


COMPUTER IMAGE CORPORATION			
2475 W. 2nd AVE			
DENVER, CO. 80223			
SCALE	NONE	REVISIONS	BY DATE
DATE	11-10-81		
DRN	ER. CKD		
APVD			
TITLE	SYSTEM IV DIGITAL BUS TERMINATOR		NO CIC-W-33A SHEET 3 OF 3

WIRING SIDE



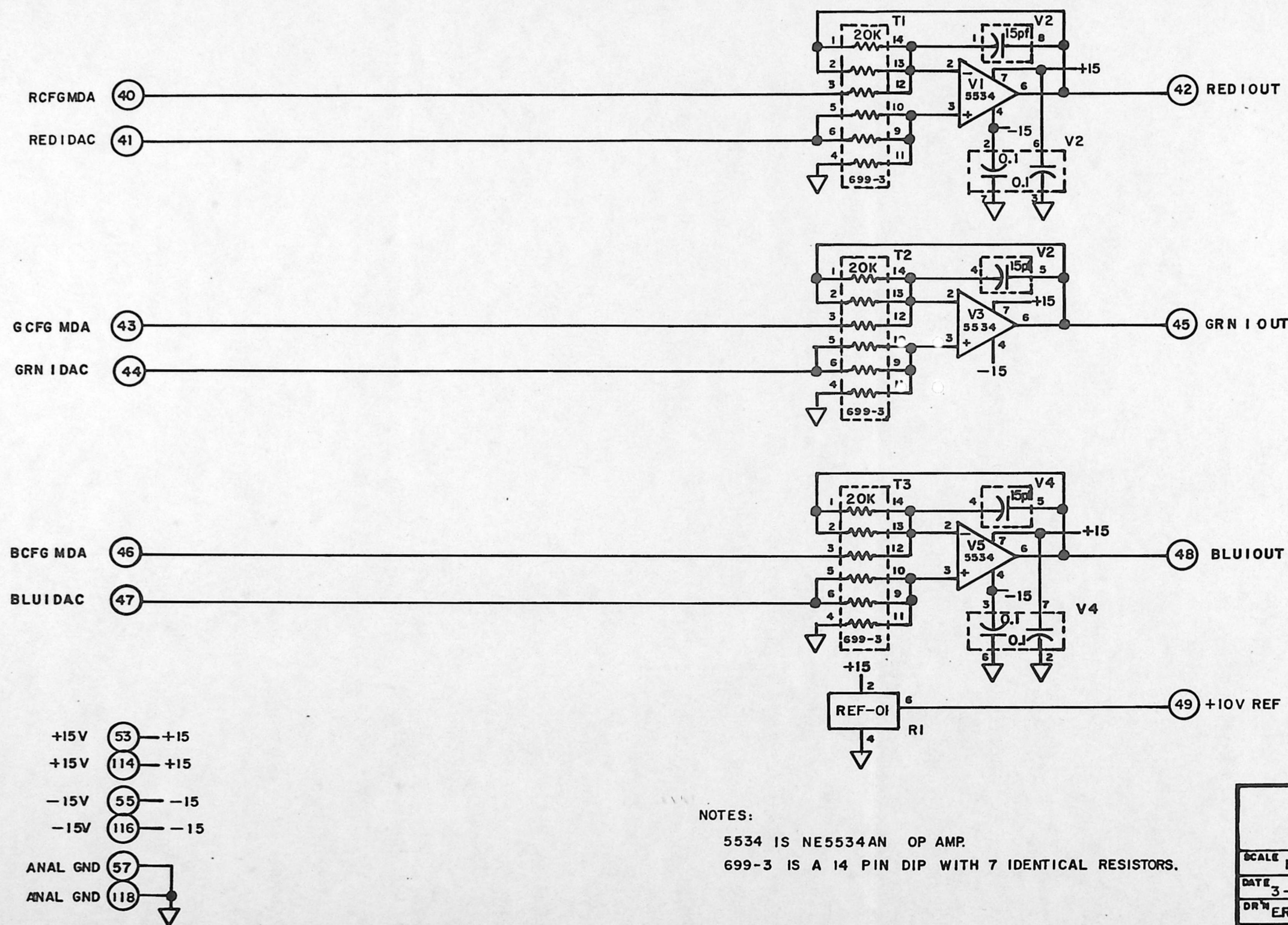
COMPONENT SIDE



XB-1	BRPUSTROBE
2	BRPUWAIT
3	BHSYNCH
4	BSSYNCH
5	BNHSYNCH
6	BFSYNCH
7	BVCKG
8	BCON 0
9	BCON 1
10	BRPUIOSEL
XC-1	BBUSSR
2	BSYNCHSR 0
3	BSYNCHSR 1
4	BMSTRCLK
5	N/A
6	N/A
7	N/A
8	N/A
9	N/A
10	N/A

REV: A,B,C,

SCALE		REVISIONS		BY	DATE
DATE 12/30/81					
DR GSH	CKD				
APVO					
TITLE SYSTEM IV DIGITAL BUS TERMINATOR LAYOUT				NO CIC-W-33 SH 4 OF 4	

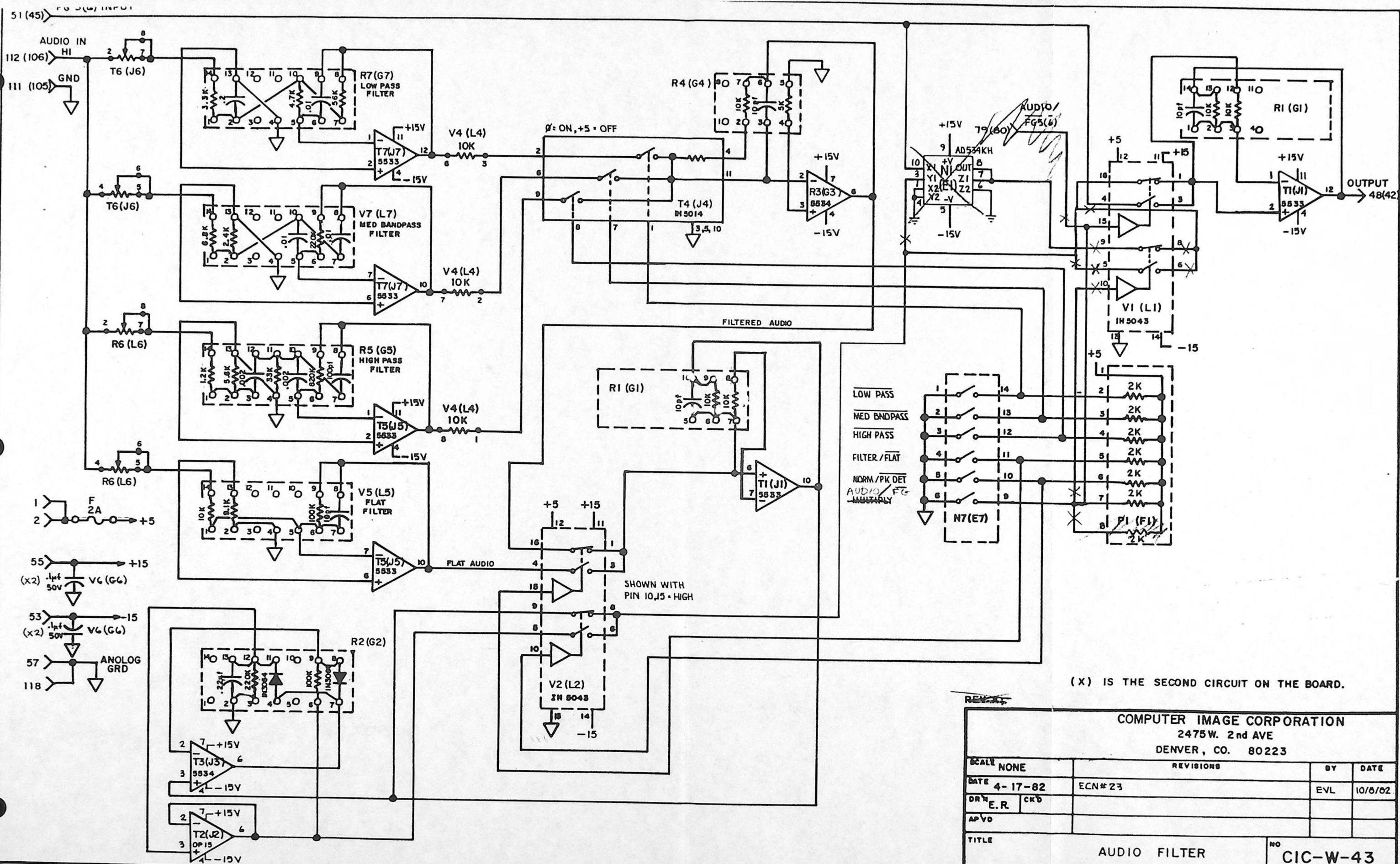


NOTES:

5534 IS NE5534AN OP AMP.

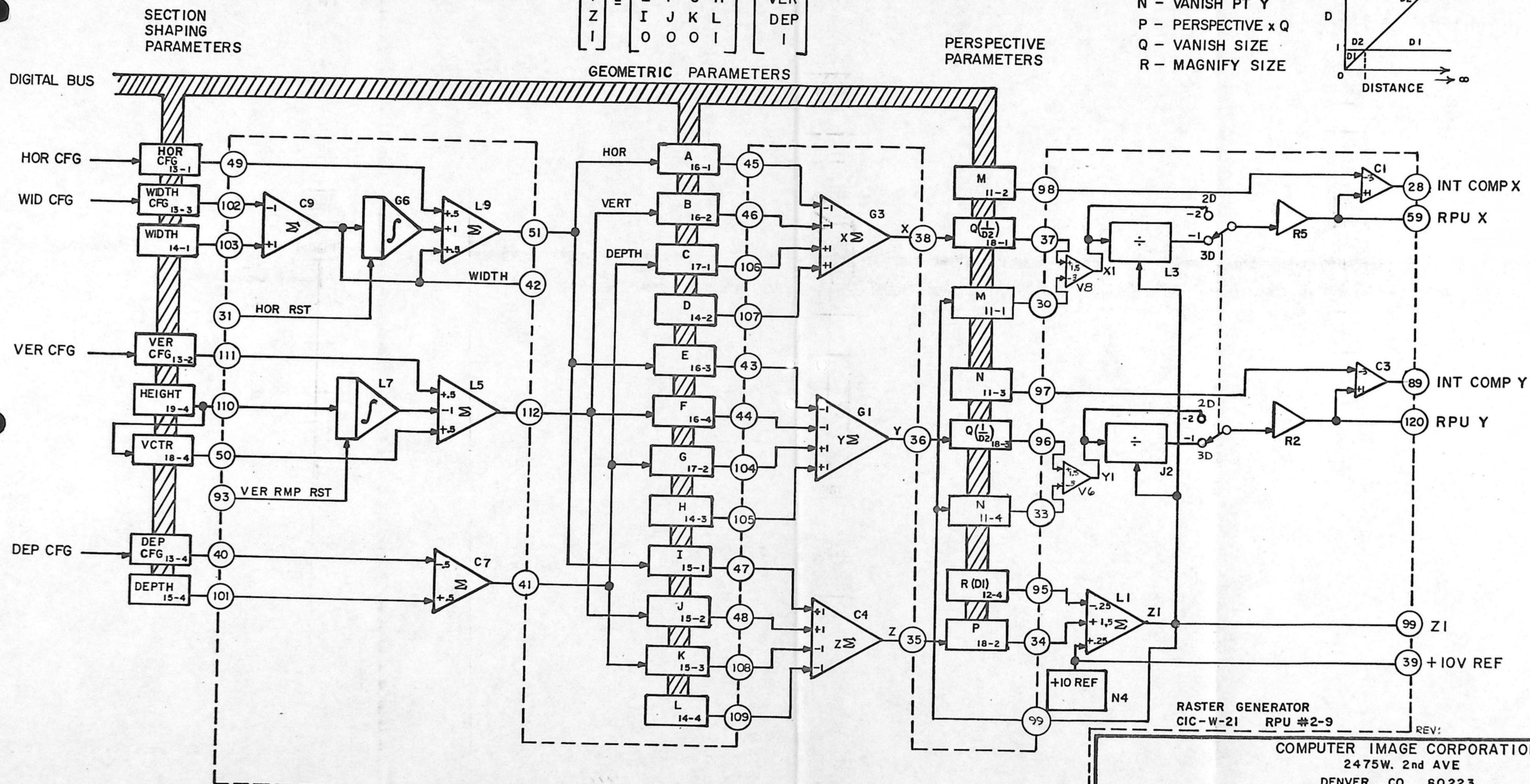
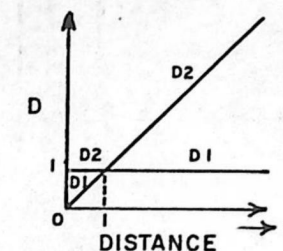
699-3 IS A 14 PIN DIP WITH 7 IDENTICAL RESISTORS.

COMPUTER IMAGE CORPORATION			
2475W. 2nd AVE			
DENVER, CO. 80223			
SCALE NONE	REVISIONS	BY	DATE
DATE 3-17-82	PER WCA MARKED PRINT	E.R.	4-27-82
DRN ER.	CKD		
APVD			
TITLE			NO
SYSTEM IV COLOR ADDERS			CIC-W-42

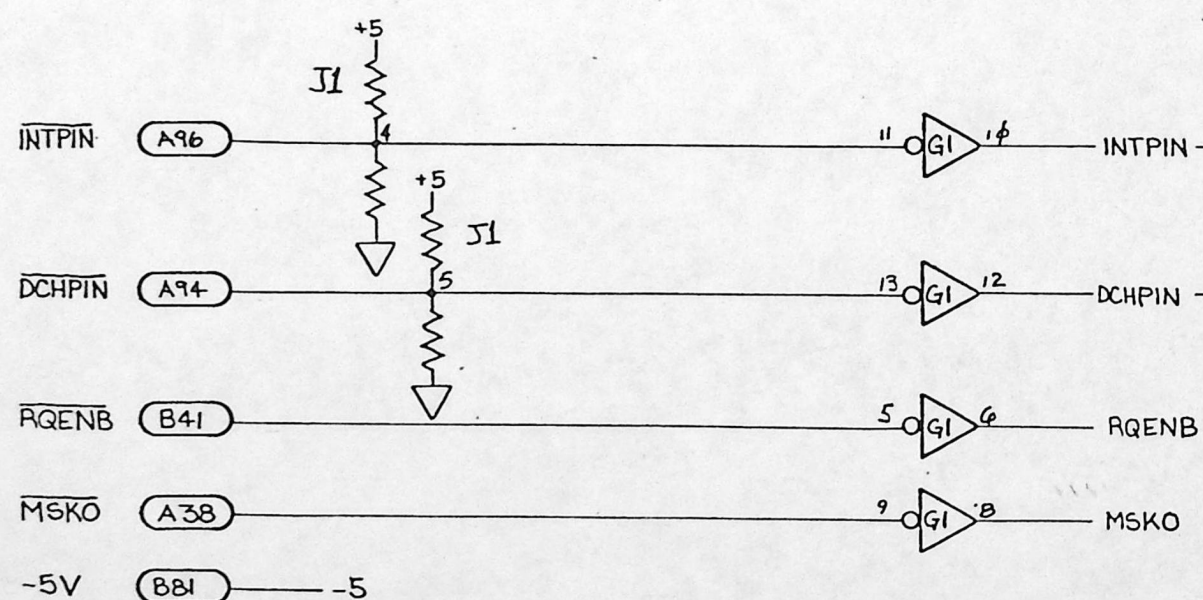
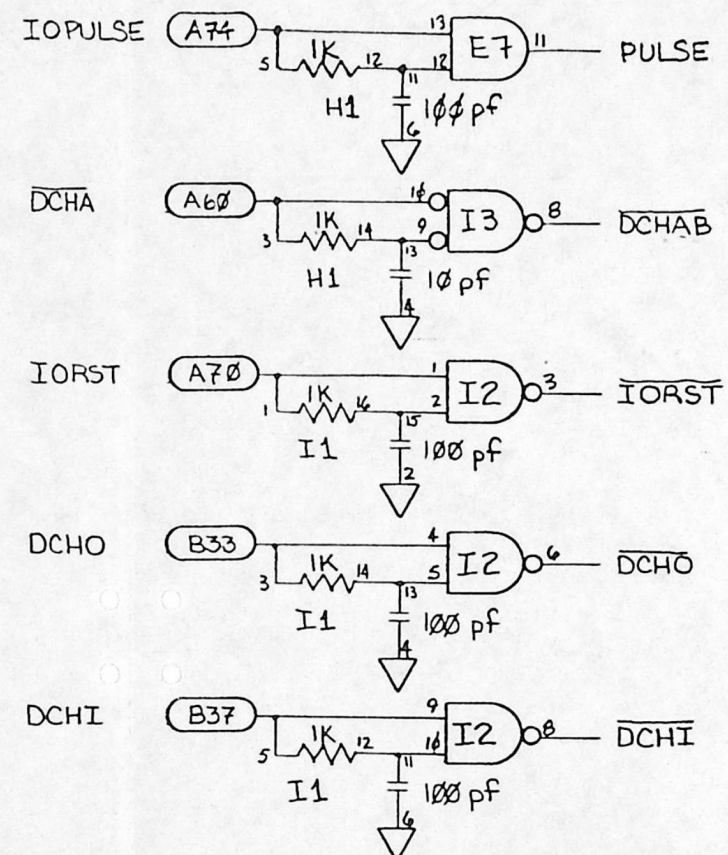
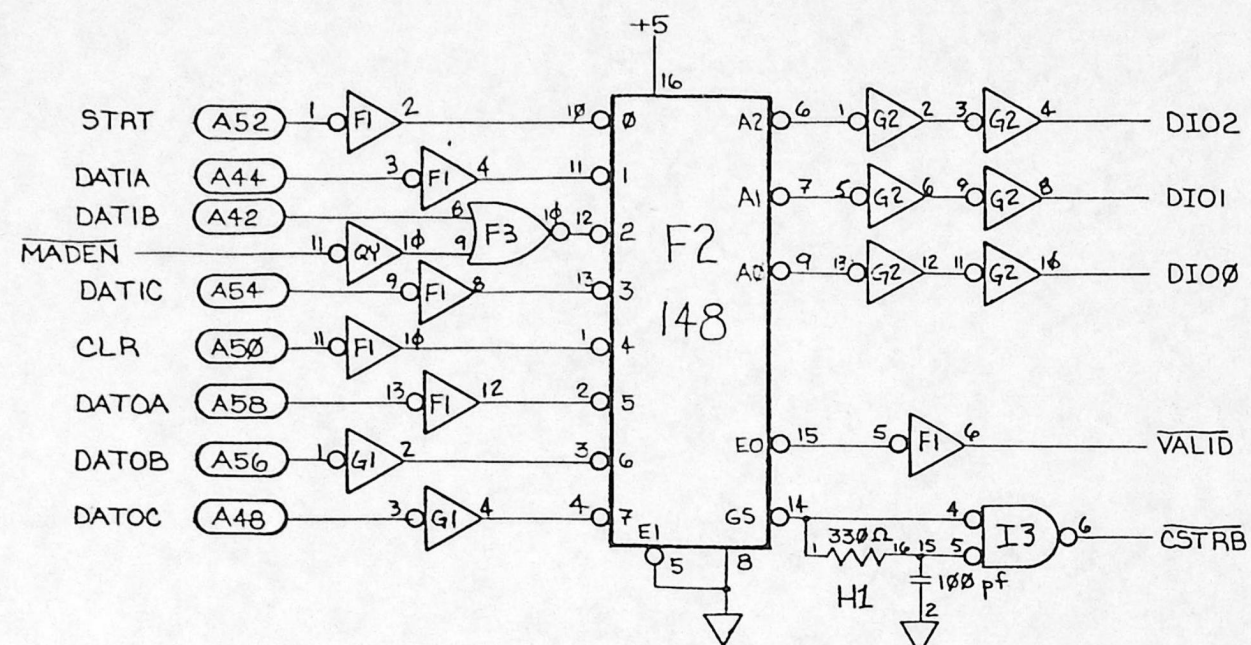


$$\begin{bmatrix} X \\ Y \\ Z \\ I \end{bmatrix} = \begin{bmatrix} \text{HOR} & \text{VERT} & \text{DEPTH} \\ A & B & C & D \\ E & F & G & H \\ I & J & K & L \\ O & O & O & I \end{bmatrix} \begin{bmatrix} \text{HOR} \\ \text{VER} \\ \text{DEP} \\ I \end{bmatrix}$$

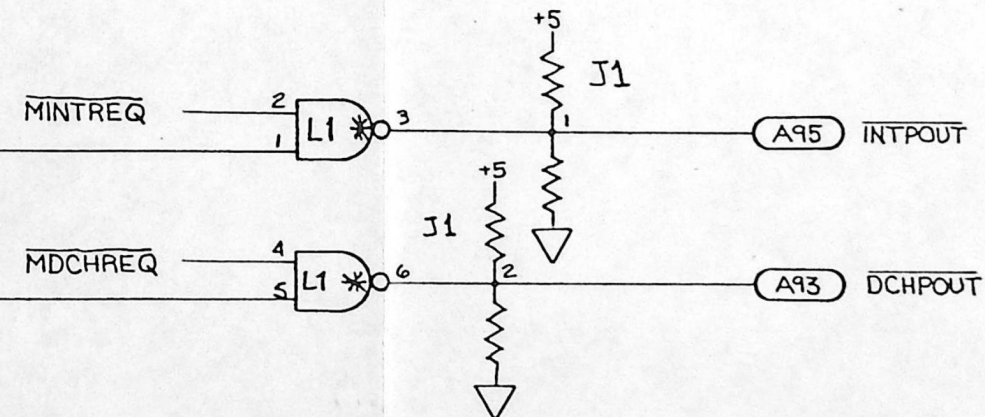
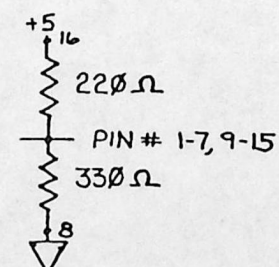
M - VANISH PT X
N - VANISH PT Y
P - PERSPECTIVE x Q
Q - VANISH SIZE
R - MAGNIFY SIZE



COMPUTER IMAGE CORPORATION			
2475W. 2nd AVE			
DENVER, CO. 80223			
SCALE NONE	REVISIONS	BY	DATE
DATE 2-24-82	VAN PT.	E.R.	5-10-82
DRW E.R.	CKD		
APVD			
TITLE	RASTER PROCESSING UNIT BLOCK DIAGRAM SYSTEM IV		NO
	BCIC - 2		



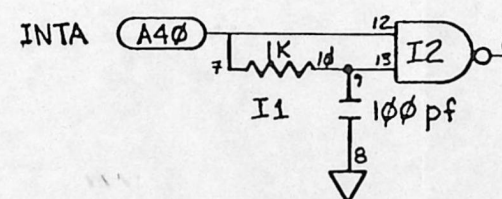
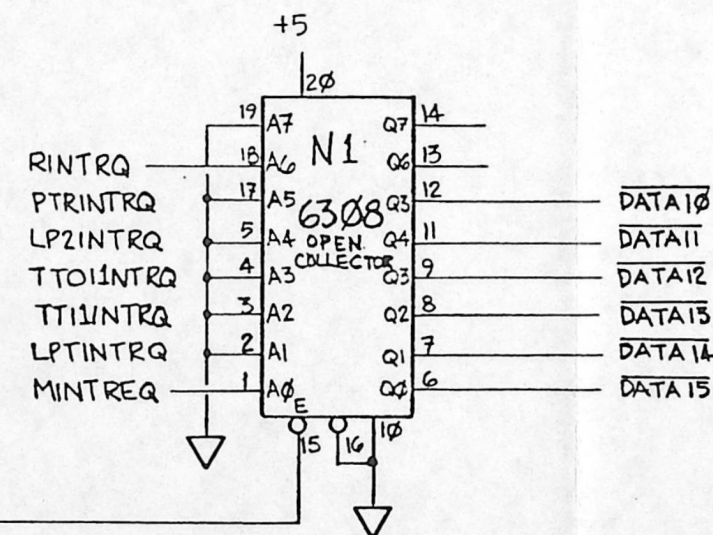
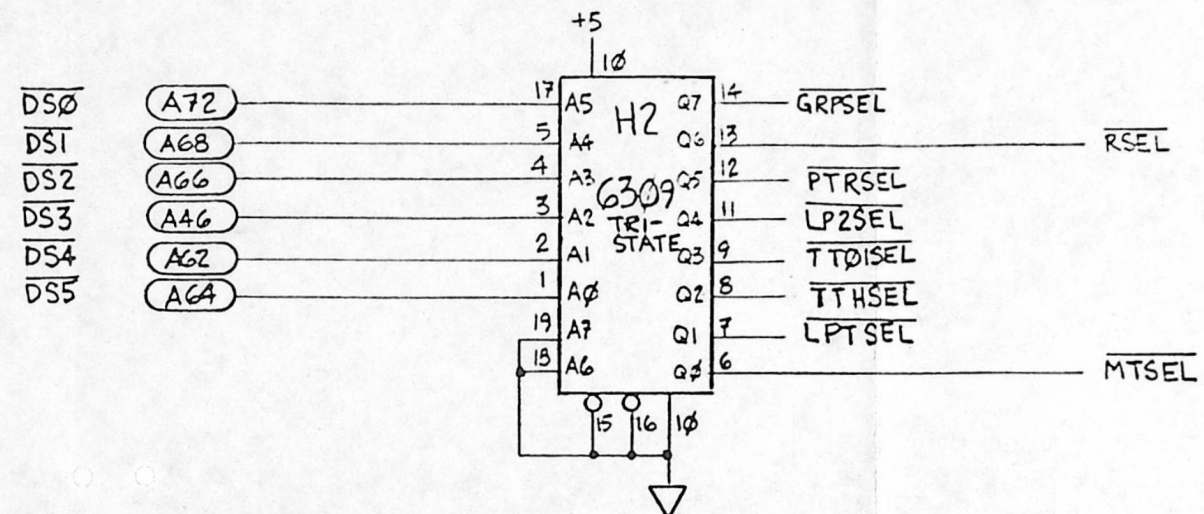
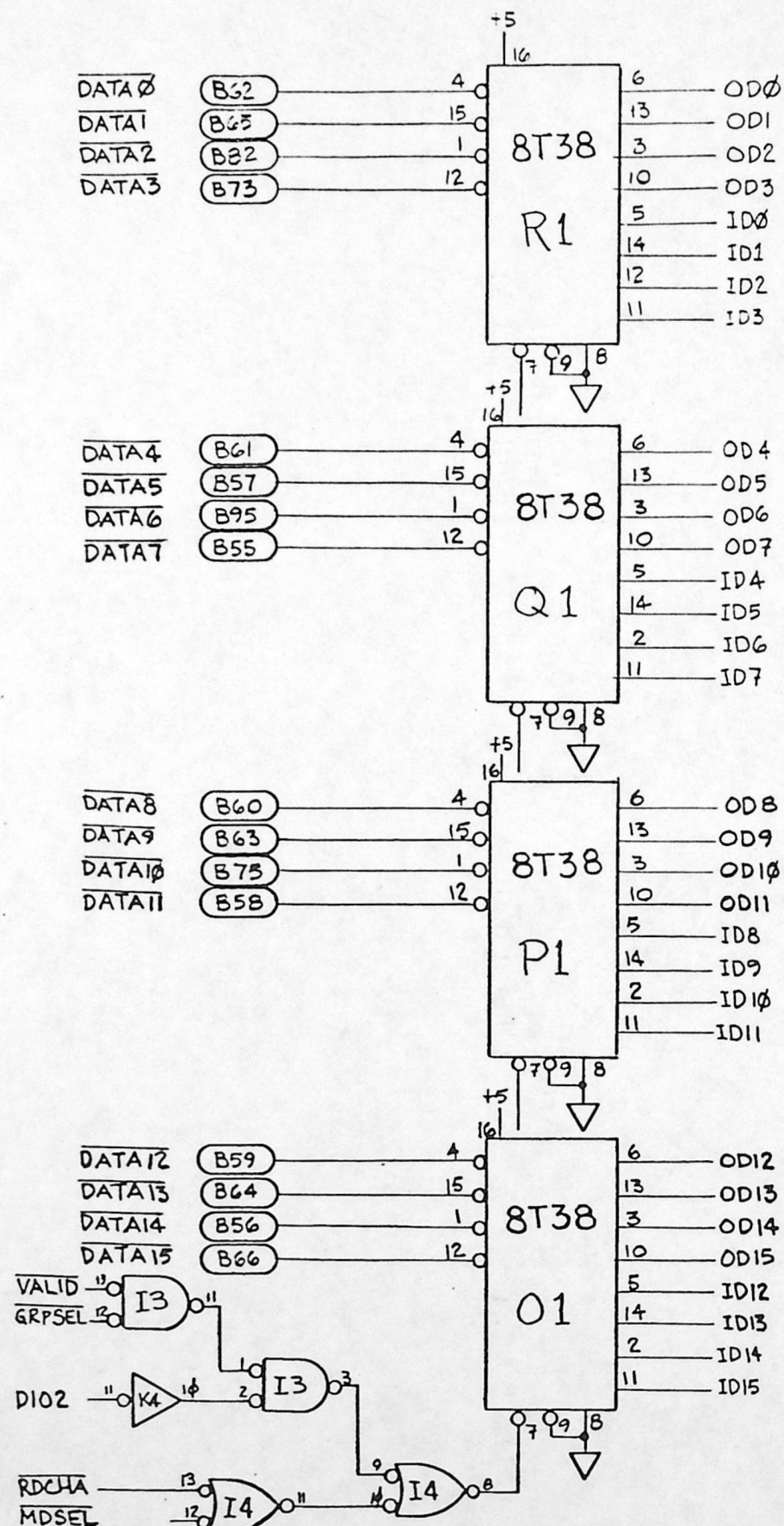
NOTE:
TYPICAL
J1



REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

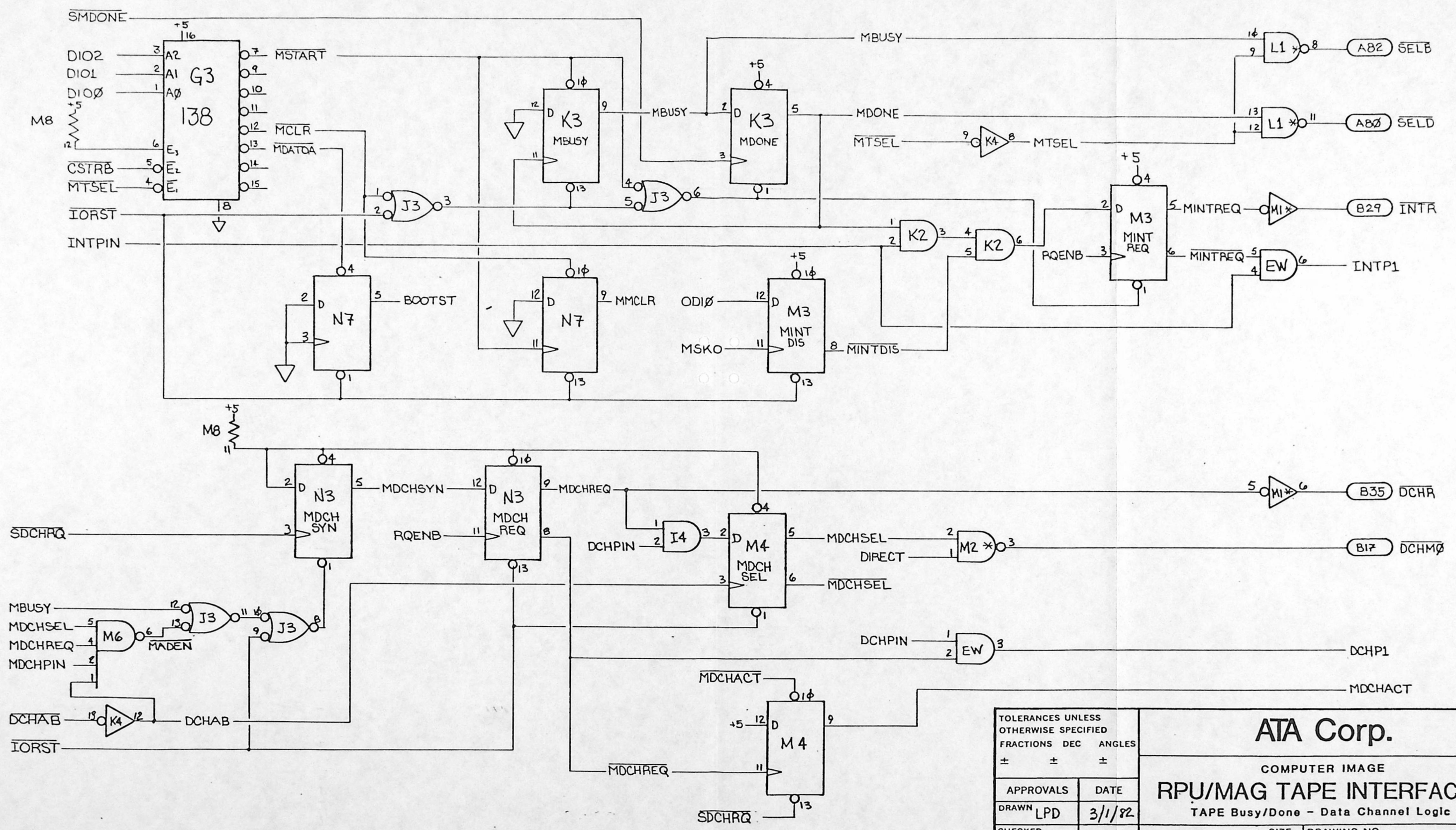
TOLERANCES UNLESS OTHERWISE SPECIFIED			
FRACTIONS	DEC	ANGLES	
±	±	±	
APPROVALS	DATE	ATA Corp. COMPUTER IMAGE RPU/MAG TAPE INTERFACE I/O Buffers & Select Logic CIC-W-60A SIZE B DRAWING NO. 11119L1	
DRAWN	3/1/82		
CHECKED			
DO NOT SCALE DRAWING		SHEET 3 of 11	

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED



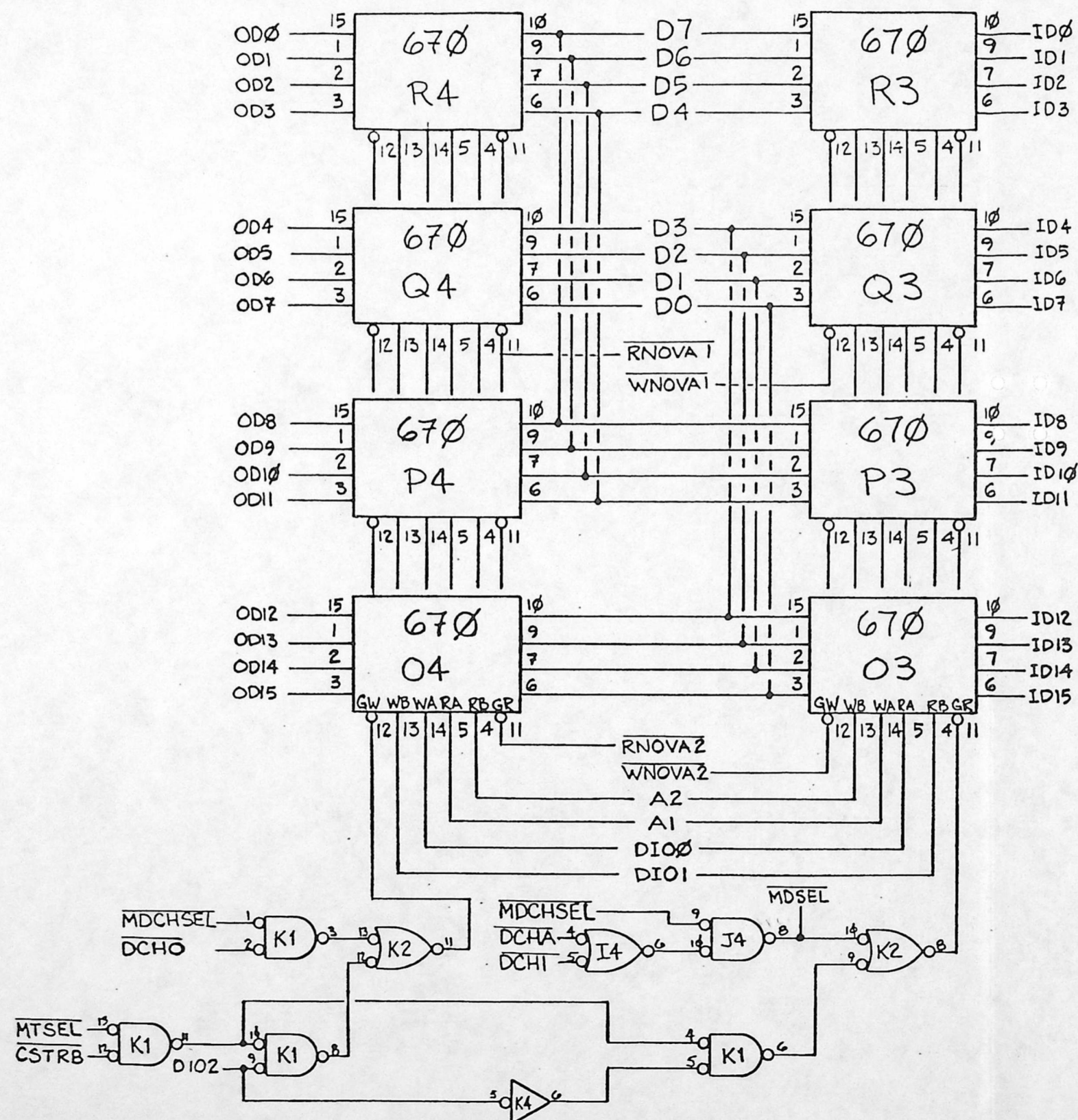
TOLERANCES UNLESS OTHERWISE SPECIFIED			ATA Corp.	
FRACTIONS	DEC	ANGLES	COMPUTER IMAGE	
±	±	±	RPU/MAG TAPE INTERFACE	
APPROVALS		DATE	Data Bus Receivers & Drivers, Device Selects	
DRAWN		3/1/82	CIC-W-60A	
CHECKED			SIZE B	
			DRAWING NO. 11119L1	
DO NOT SCALE DRAWING			SHEET 4 of 11	

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED



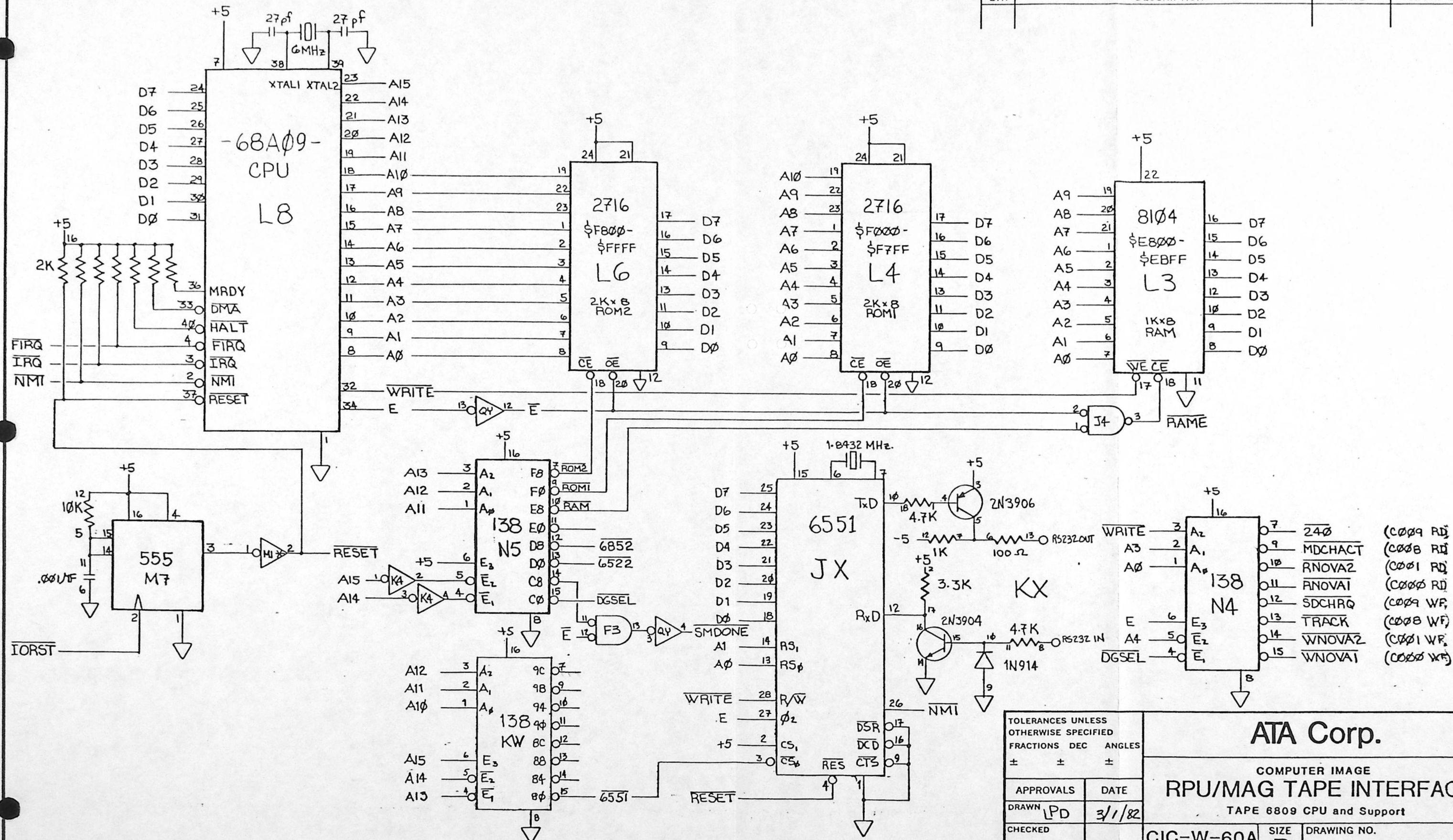
TOLERANCES UNLESS OTHERWISE SPECIFIED FRACTIONS DEC ANGLES ± ± ±			ATA Corp. COMPUTER IMAGE RPU/MAG TAPE INTERFACE TAPE Busy/Done - Data Channel Logic		
APPROVALS	DATE				
DRAWN LPD	3/1/82		CIC-W-60A	SIZE B	DRAWING NO. 11119L1
CHECKED			DO NOT SCALE DRAWING SHEET 5 of 11		

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED



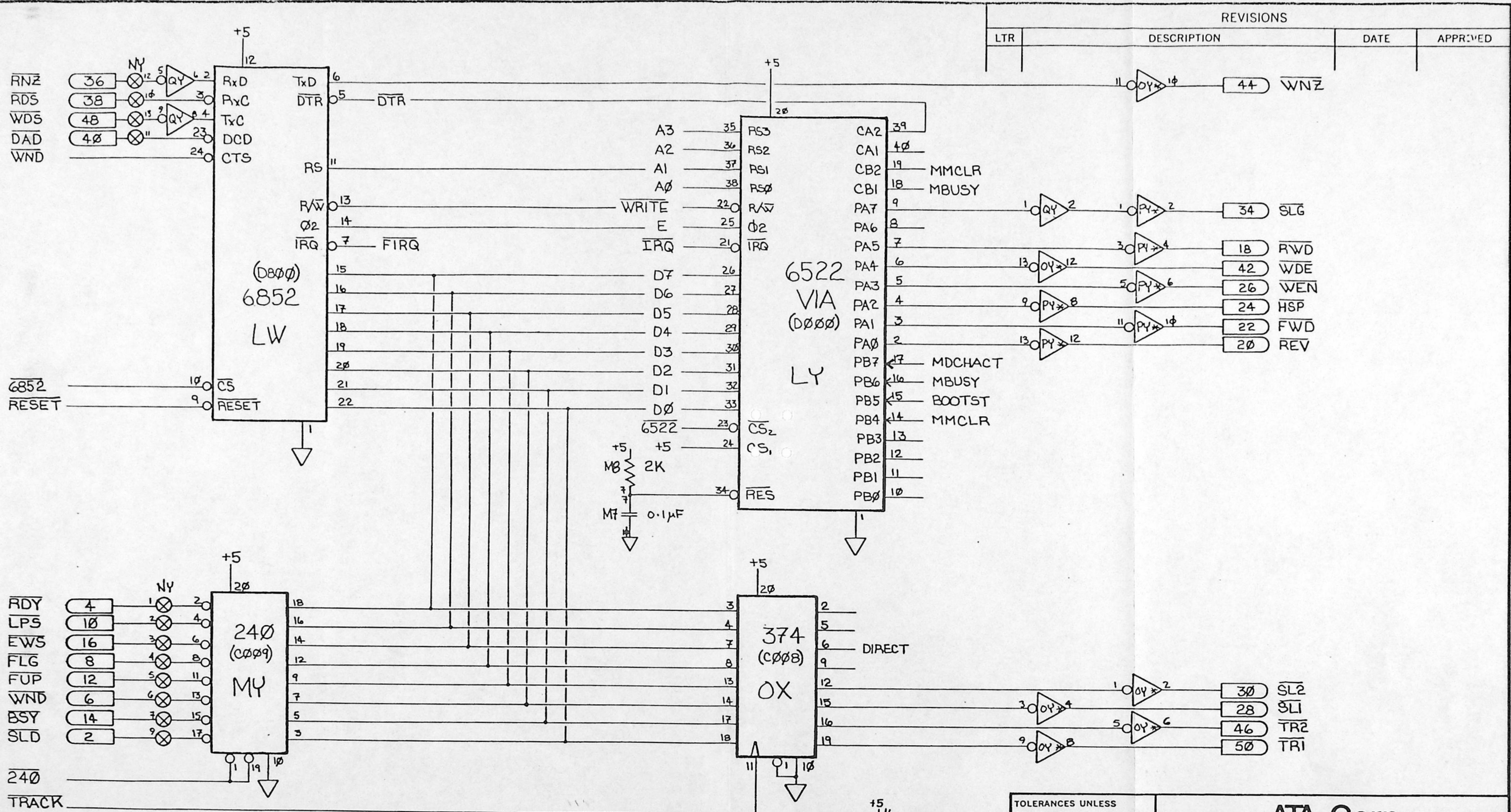
TOLERANCES UNLESS OTHERWISE SPECIFIED			ATA Corp.	
FRACTIONS	DEC	ANGLES		
±	±	±	COMPUTER IMAGE	
APPROVALS			RPU/MAG TAPE INTERFACE	
DRAWN <i>gk</i>			TAPE Data In and Out Buffers	
3/1/82			CIC-W-60A	DRAWING NO. 11119L1
CHECKED				
			B	
			DO NOT SCALE DRAWING	
			SHEET 6 of 11	

REVISIONS				
LTR	DESCRIPTION	DATE	APPROVED	



TOLERANCES UNLESS OTHERWISE SPECIFIED		
FRACTIONS	DEC	ANGLES
$\pm$	$\pm$	$\pm$
APPROVALS	DATE	
DRAWN LPD	3/1/82	
CHECKED		

ATA Corp.			
COMPUTER IMAGE			
RPU/MAG TAPE INTERFACE			
TAPE 6809 CPU and Support			
CIC-W-60A	SIZE B	DRAWING NO. 11119L1	
DO NOT SCALE DRAWING		SHEET 7 of 11	



REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

NOTE: ⊗ = PIN # = 1-7, 9-15
 NY

TOLERANCES UNLESS OTHERWISE SPECIFIED			
FRACTIONS	DEC	ANGLES	
±	±	±	
APPROVALS		DATE	
DRAWN LPD		3/1/82	
CHECKED			

ATA Corp.

COMPUTER IMAGE

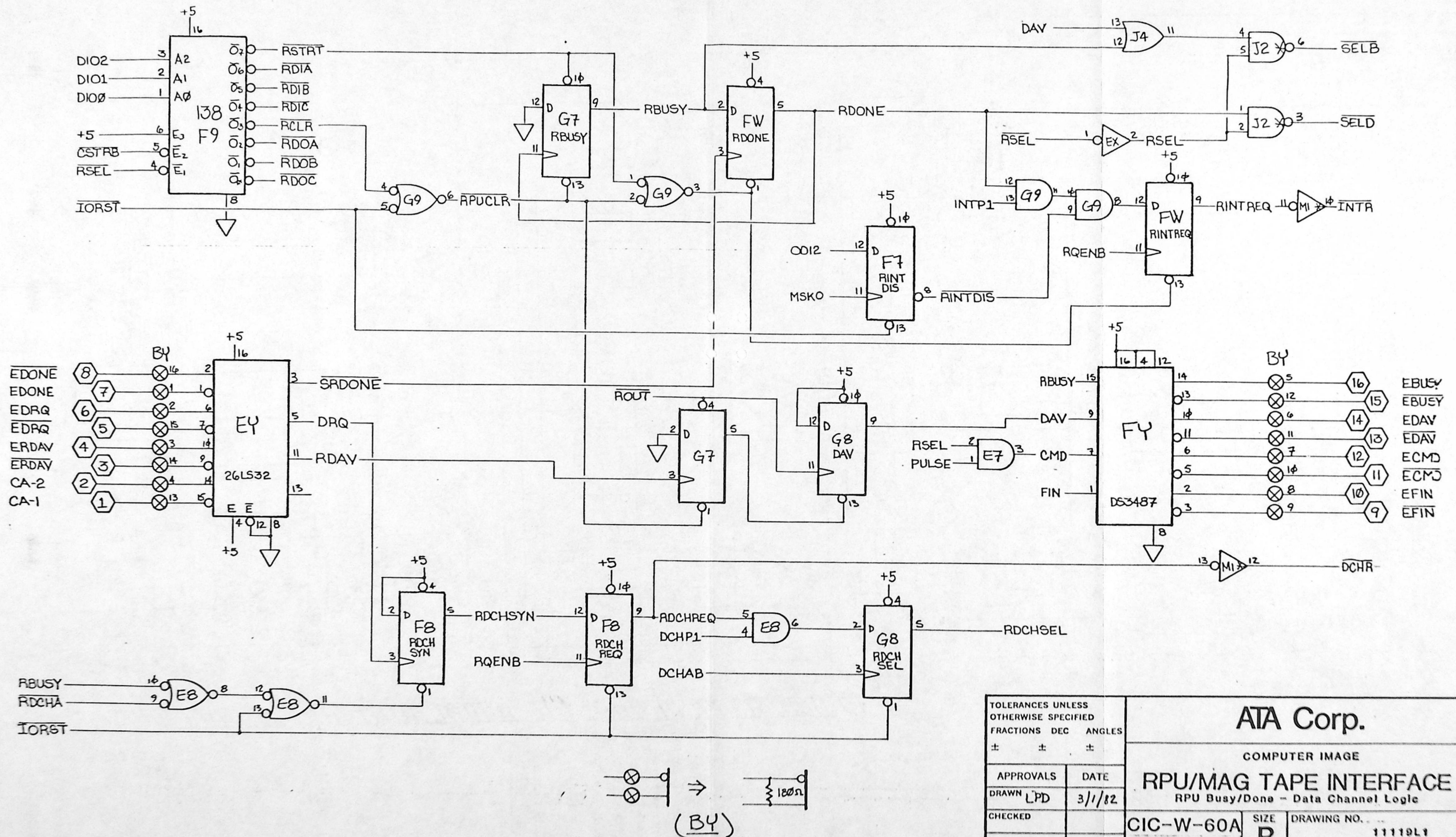
RPU/MAG TAPE INTERFACE

TAPE Control, Status and R/W

CIC-W-60A	SIZE B	DRAWING NO. 11119L1
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DO NOT SCALE DRAWING SHEET 8 of 11

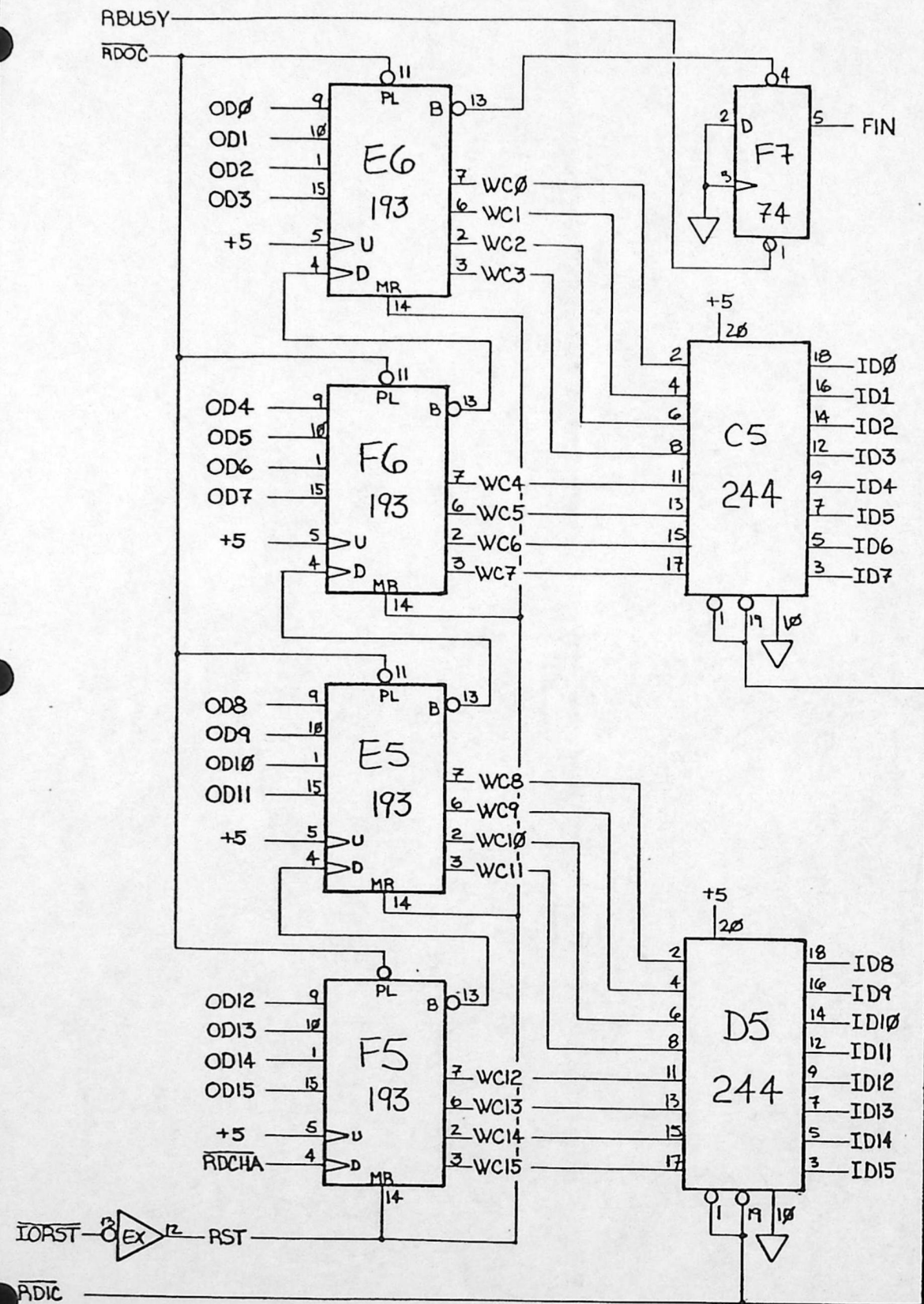
REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED



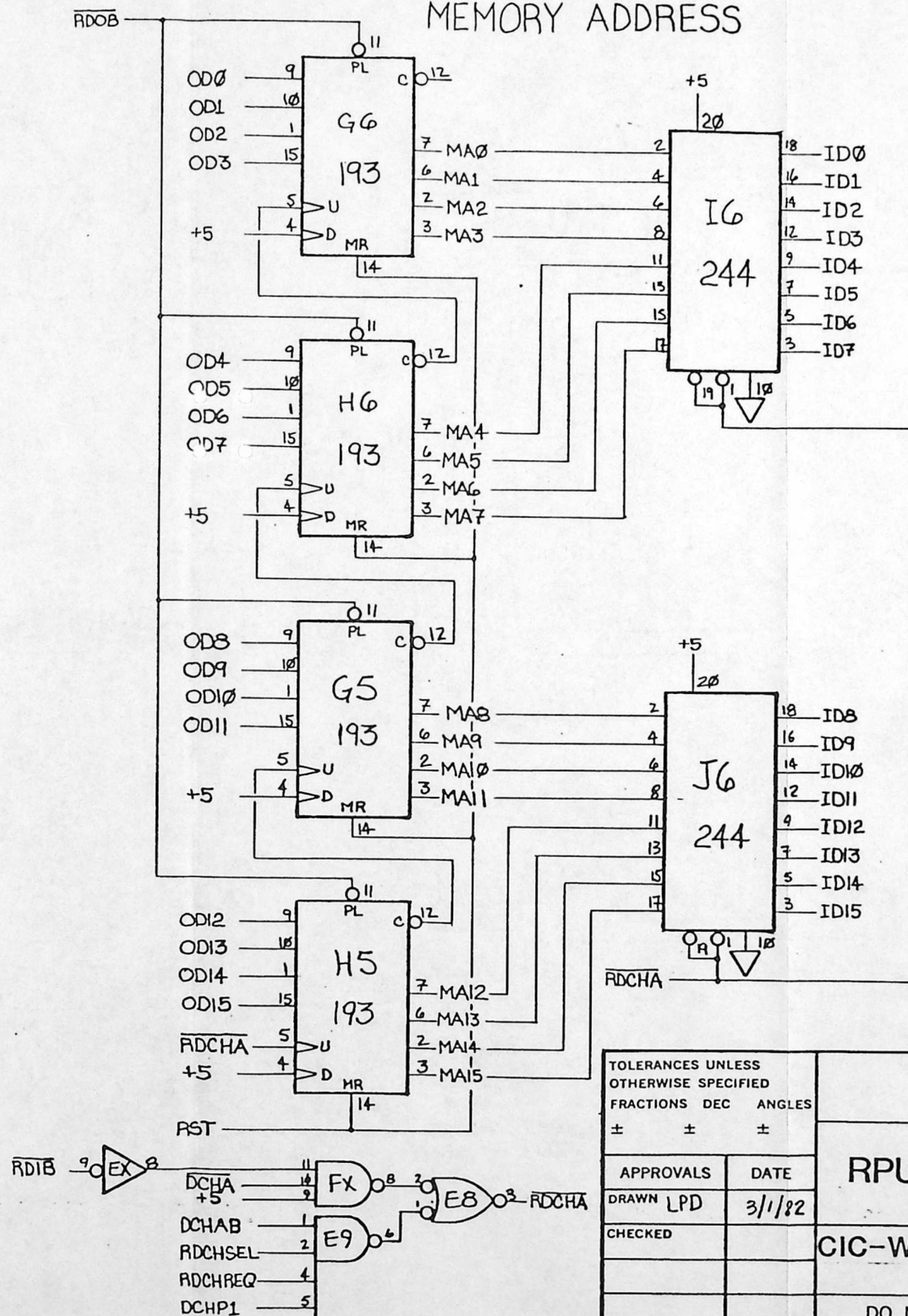
TOLERANCES UNLESS OTHERWISE SPECIFIED		
FRACTIONS	DEC	ANGLES
$\pm$	$\pm$	$\pm$
APPROVALS	DATE	
DRAWN LPD	3/1/82	
CHECKED		

ATA Corp.		
COMPUTER IMAGE		
RPU/MAG TAPE INTERFACE		
RPU Busy/Done - Data Channel Logic		
CIC-W-60A	SIZE B	DRAWING NO. 11119L1
DO NOT SCALE DRAWING		
SHEET 2 of 11		

WORD COUNT



MEMORY ADDRESS



REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

TOLERANCES UNLESS OTHERWISE SPECIFIED
FRACTIONS DEC ANGLES
± ± ±

APPROVALS	DATE
DRAWN LPD	3/1/82
CHECKED	

ATA Corp.

COMPUTER IMAGE
RPU/MAG TAPE INTERFACE

RPU DMA Counters

CIC-W-60A

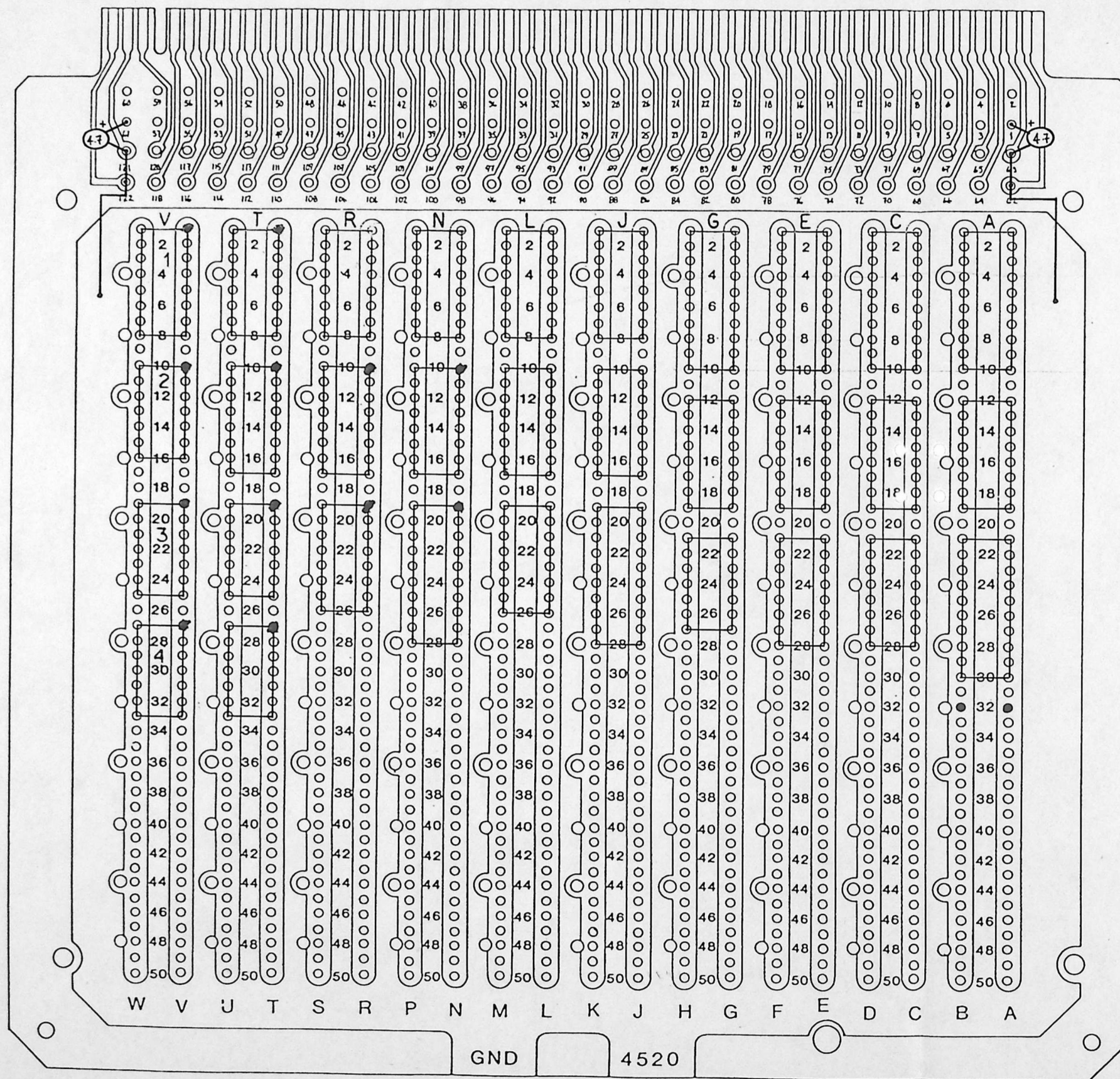
SIZE
B

DRAWING NO.

11119L1

DO NOT SCALE DRAWING

SHEET 10 of 11



REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

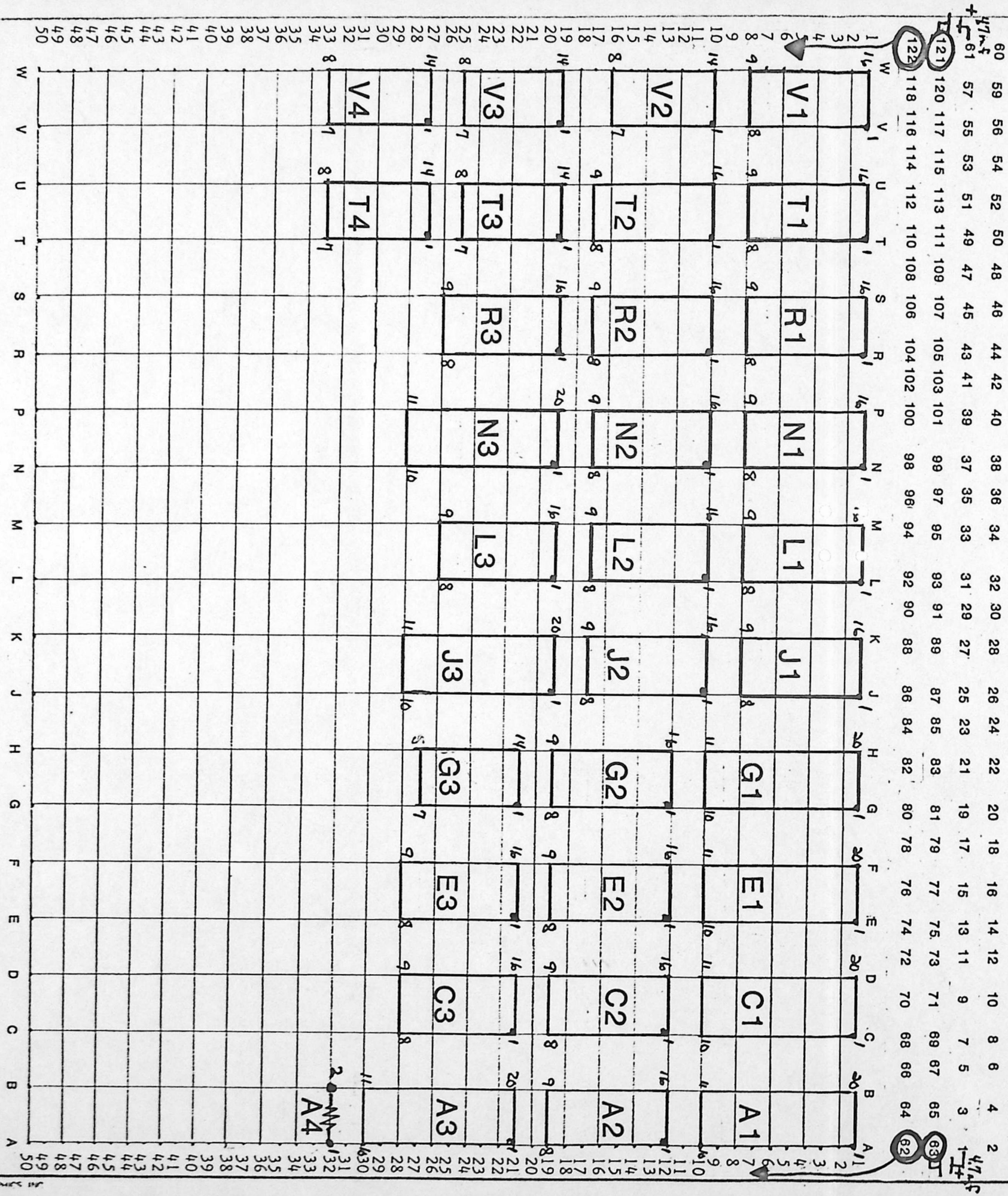
USE VIEW TO PUNCH OUT UNNEEDED PINS

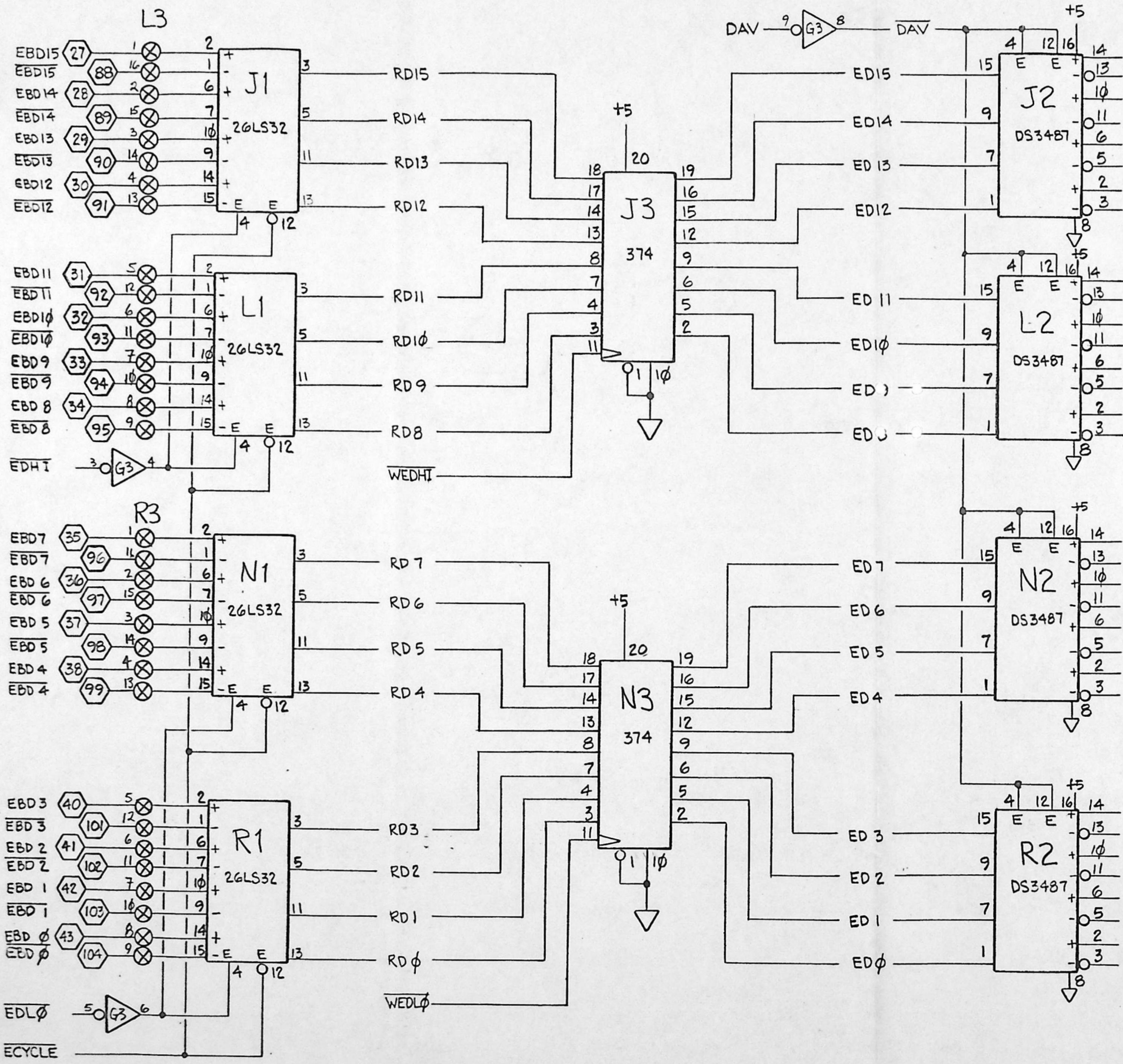
TOLERANCES UNLESS OTHERWISE SPECIFIED				
FRACTIONS	DEC	ANGLES		
±	±	±		
APPROVALS	DATE	RPU/ECLIPSE INTERFACE		
DRAWN				
CHECKED		CIC-W-61A	SIZE	DRAWING NO.
			B	
DO NOT SCALE DRAWING			SHEET 3 OF 7	

REVISIONS			
APPROVED	DATE	DESCRIPTION	LTR

ATA Corp.			
COMPUTER IMAGE			
RPU/ECLIPSE INTERFACE			
Board Layout			
CIC-W-61A		SIZE B	DRAWING NO. 11012J1
DO NOT SCALE DRAWING		SHEET 4 OF 7	

TOLERANCES UNLESS OTHERWISE SPECIFIED	
FRACTIONS	DEC ANGLES
±	±
APPROVALS	DATE
DRAWN	1-13-82
CHECKED	Rev.B





REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

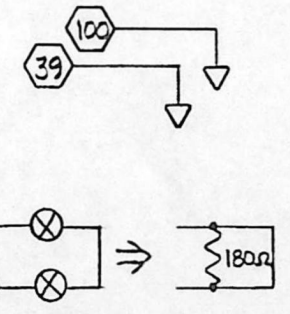
EBD 15
EBD 15
EBD 14
EBD 14
EBD 13
EBD 13
EBD 12
EBD 12

EBD 11
EBD 11
EBD 10
EBD 10
EBD 9
EBD 9
EBD 8
EBD 8

EBD 7
EBD 7
EBD 6
EBD 6
EBD 5
EBD 5
EBD 4
EBD 4

EBD 3
EBD 3
EBD 2
EBD 2
EBD 1
EBD 1
EBD 0
EBD 0

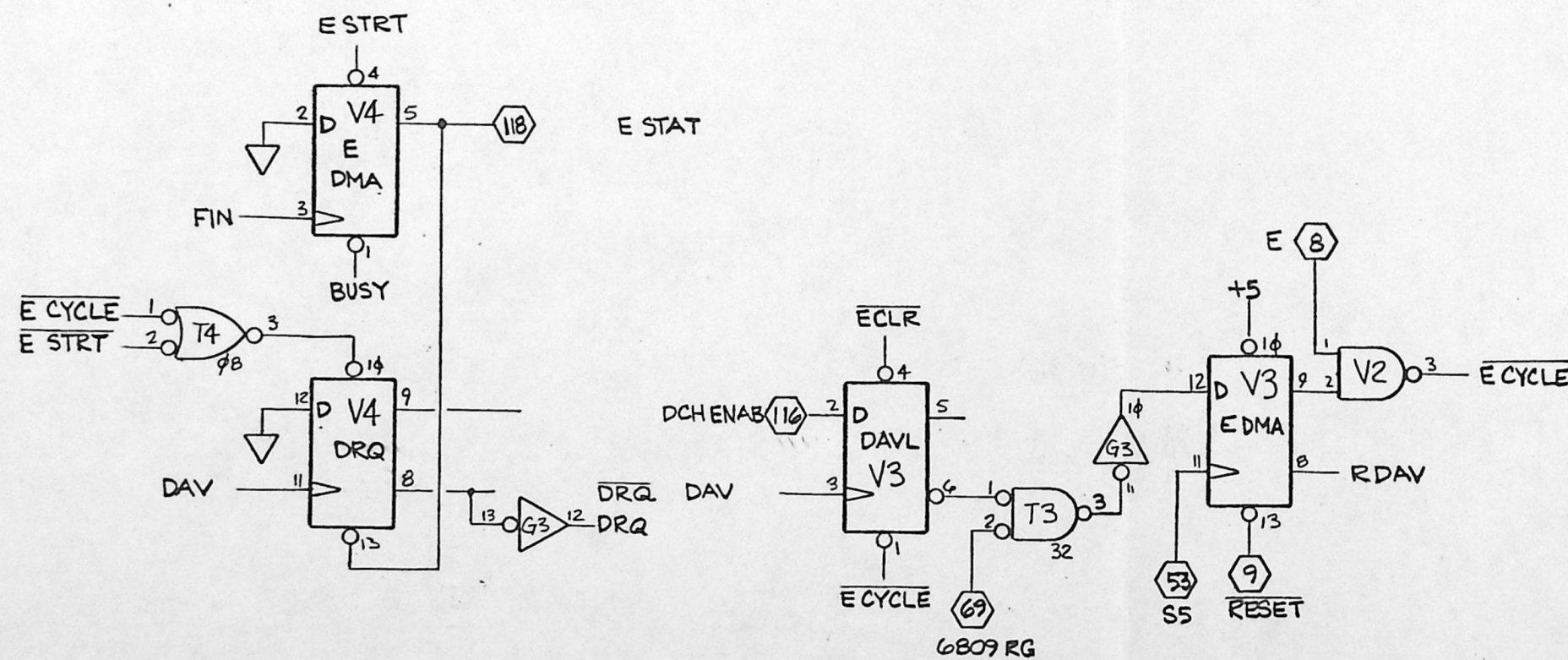
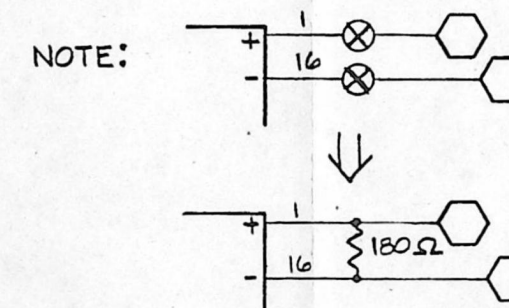
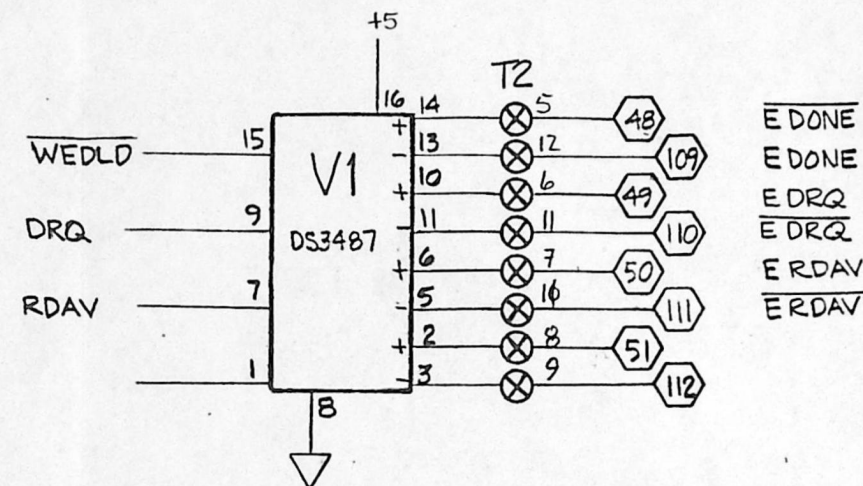
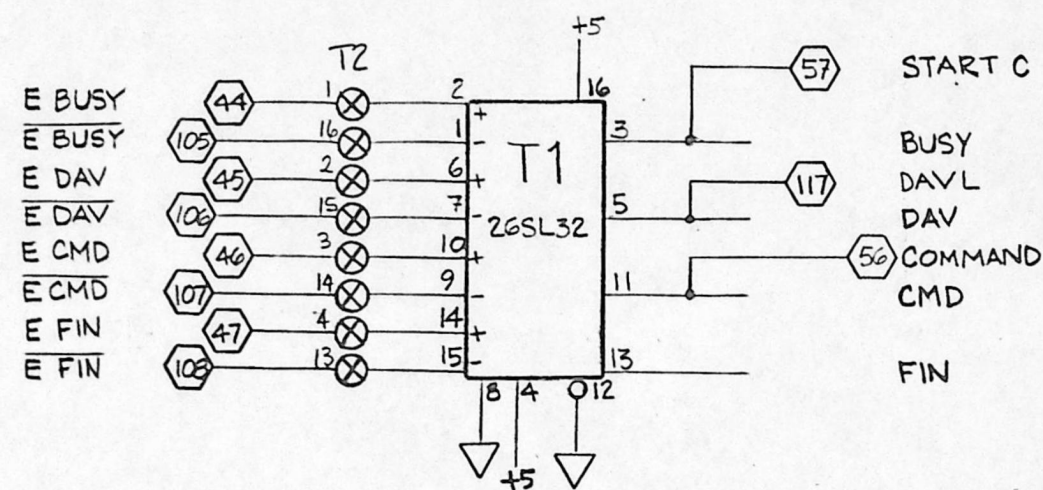
NOTES:



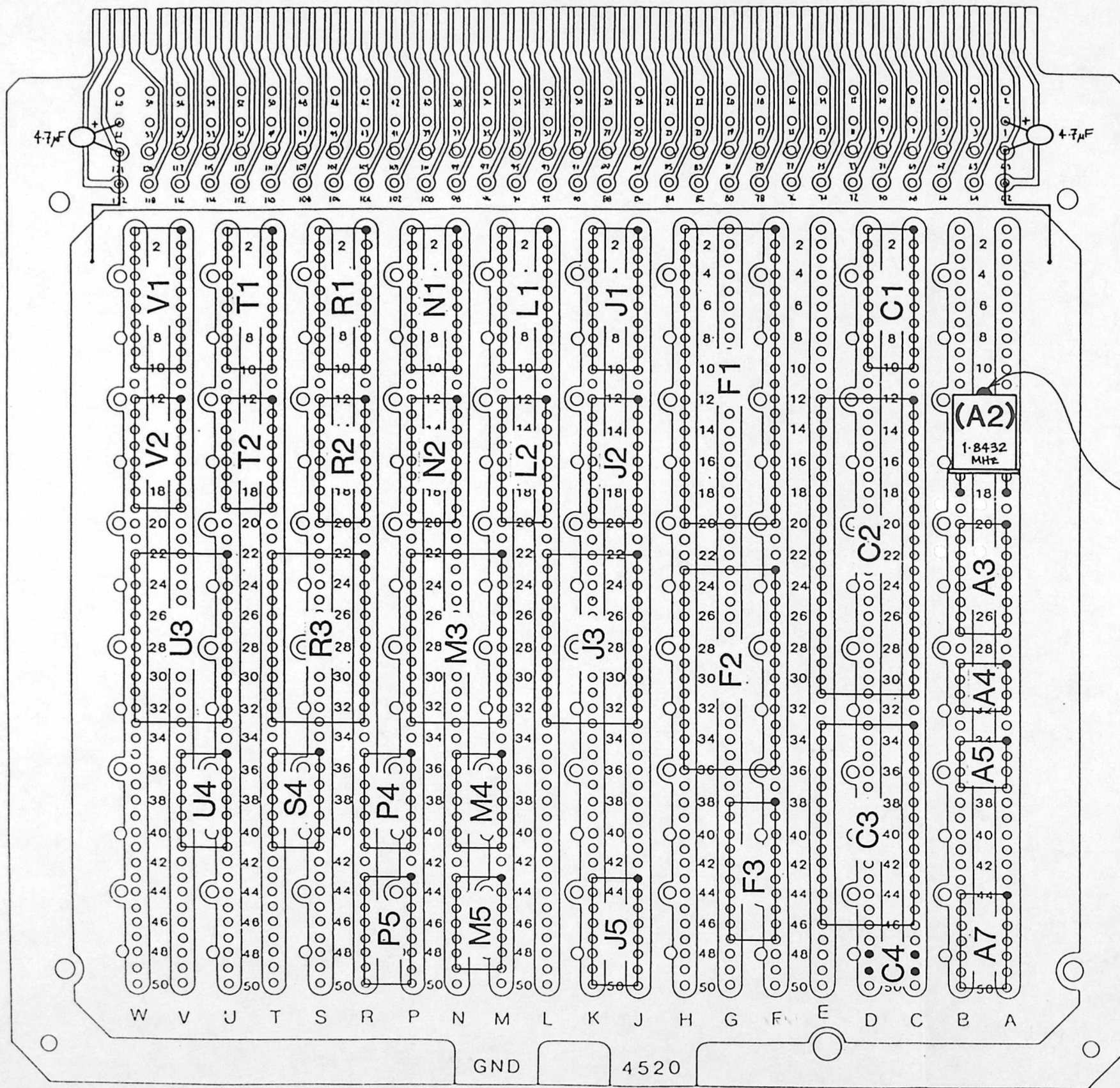
TOLERANCES UNLESS OTHERWISE SPECIFIED		
FRACTIONS	DEC	ANGLES
±	±	±
APPROVALS	DATE	
DRAWN <i>[Signature]</i>	3/10/82	
CHECKED		
Rev. A		

ATA Corp.	
COMPUTER IMAGE	
RPU/ECLIPSE INTERFACE	
DATA BUFFERS	
CIC-W-61A	DRAWING NO. 11012J1
DO NOT SCALE DRAWING	SHEET 6 OF 7

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED



TOLERANCES UNLESS OTHERWISE SPECIFIED			ATA Corp.	
FRACTIONS	DEC	ANGLES		
±	±	±	COMPUTER IMAGE RPU/ECLIPSE INTERFACE Handshake Signals	
APPROVALS	DATE			
DRAWN <i>JS</i>	3-1-82			
CHECKED		CIC-W-61A	SIZE B	DRAWING NO. 11012J1
Rev. A				
		DO NOT SCALE DRAWING		SHEET 7 OF 7



WIRING SIDE

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

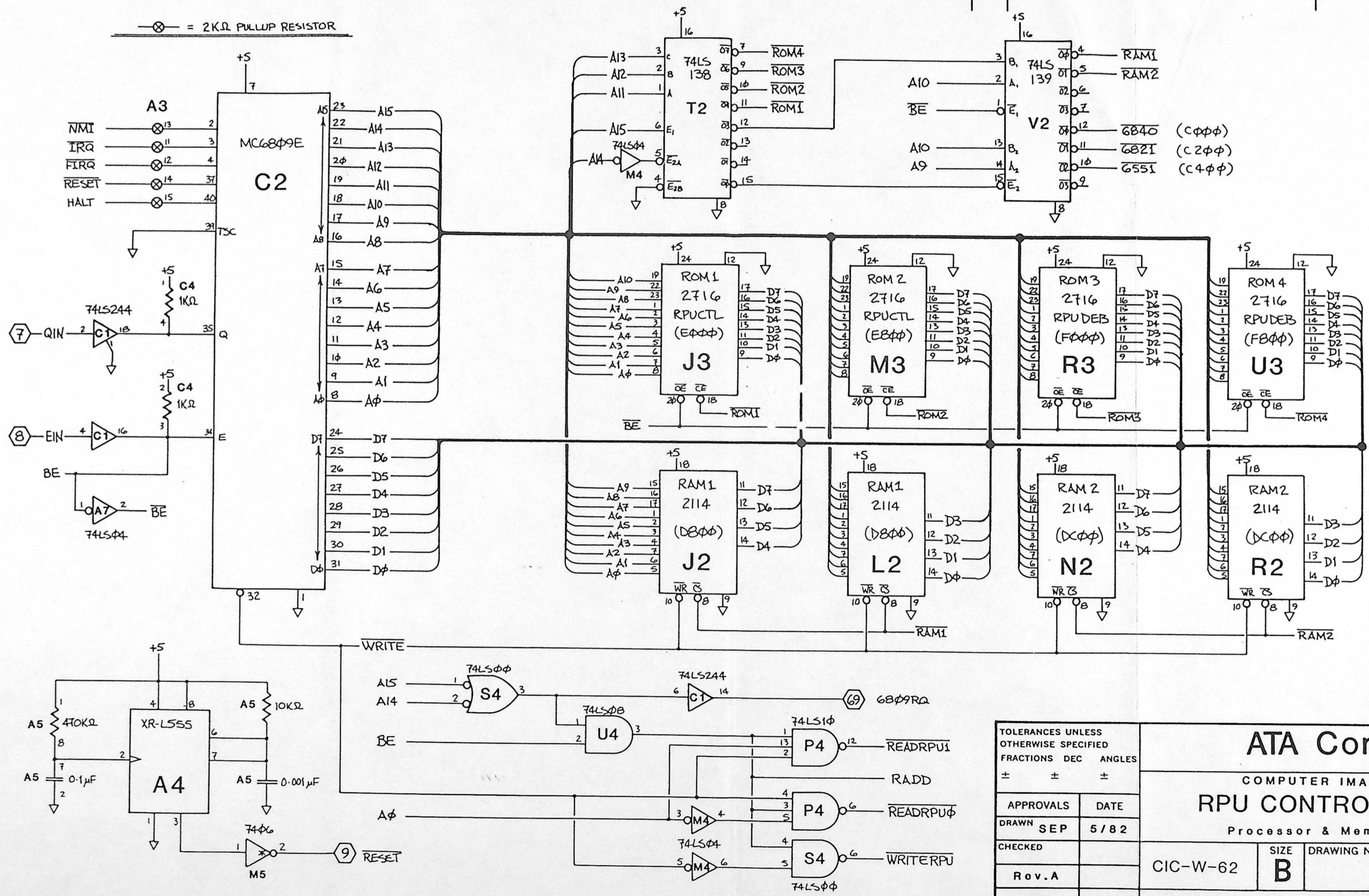
PARTS LIST

Qty	P/N	Description	Reference
7	74LS244	Octal Buffer	C1,J1,L1,N1,R1,T1,V1
1	MC6809E	MPU	C2
1	SY6551	ACIA	C3
1	MC6821	PIA	F1
1	MC6840	Programmable Timer	F2
4	MCM2114P45	RAM	J2,L2,N2,R2
4	MK2716J-8	EPROM	J3,M3,R3,U3
1	74LS138	1-of-8 Decoder	T2
1	74LS139	Dual 2-of-4 Decoder	V2
2	74LS04	Hex Inverter	A7,M4
1	74LS10	Triple 3-In NAND Gate	P4
1	74LS00	Quad 2-In NAND Gate	S4
1	74LS08	Quad 2-In AND Gate	U4
1	7406	Hex Inverter (O.C.)	M5
1	XR-L555CP	Precision Timer	A4
1	761-1-R2K	Resistor Pack, 2K Ohm	A3
1		8PST Dip Switch	J5
1		16 Pin Dip Socket	P5
1		8 Pin Header	A5
1		20 pin Header	F3
3		Resistor, 1000 Ohm, 1/4W	C4,F3-7
1		Resistor, 470 KOhm, 1/4W	A5-1
1		Resistor, 10 KOhm, 1/4W	A5-3
3		Resistor, 3300 Ohm, 1/4W	F3-1,-5,-8
1		Resistor, 100 Ohm, 1/4W	F3-6
1	1N4148	Diode	F3-9
1	2N3906	Transistor	F3-3
1	2N3904	Transistor	F3-18
1		Capacitor, 0.001 Microfarad	A5-4
10		Capacitor, 0.1 Microfarad	A5-2&Bypass
2		Capacitor, 4.7 Microfarad	
2		Pico Fuse, 2 Amp	
1		1.8432 Mhz Crystal	(A2)

TOLERANCES UNLESS OTHERWISE SPECIFIED FRACTIONS DEC ANGLES ± ± ±			ATA Corp.		
			COMPUTER IMAGE		
APPROVALS		DATE	RPU CONTROLLER		
DRAWN SEP		5/82	BOARD LAYOUT		
CHECKED			CIC-W-62	SIZE	DRAWING NO.
Rev. A				B	10804L1
Rev. B				DO NOT SCALE DRAWING	
			SHEET 3 of 5		

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

⊗ = 2KΩ PULLUP RESISTOR



TOLERANCES UNLESS OTHERWISE SPECIFIED		
FRACTIONS	DEC	ANGLES
±	±	±
APPROVALS	DATE	
DRAWN SEP	5/82	
CHECKED		
Rev. A		
Rev. B		

ATA Corp.

COMPUTER IMAGE

RPU CONTROLLER

Processor & Memory

CIC-W-62

SIZE B

DRAWING NO. 10804L1

DO NOT SCALE DRAWING

SHEET 5 of 5

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

Designation	Qty.	Part #	Mfg.	Remarks
B1	1	MC3242	Motorola	Mem.Add.Mux.
B2	1	MC3480	Motorola	Ram Controller
E1	1	MC3459	Motorola	Nand Line Driver
J1,N1,V1	3	74LS244		TTL
G1,L1	2	74LS373		TTL
R1	1	MC345	Loco II	16Mhz Oscillator
T1	1	74LS164		TTL
E2-V2, E3-V3	16	MCM4116A-25	Motorola	16Kx1Ram-25Onsec
A4	1	74LS393		TTL Dual Mod-16ctr
C4	1	74LS04		TTL
E4	1	74LS32		TTL
G4,J4	2	74LS86		TTL
L4	1	74LS74		TTL
N4-1, 2	2			1/4Watt, 1K Ohm
N4-3	1			1/4Watt, 470 Ohm Res.
	48			.1uf Caps.
N4	1			16 Pin Header
	2			2 Amp Pico Fuse
	4			33uF Caps.

ATA Corp.

COMPUTER IMAGE

RPU RAM BOARD

Board Layout

TOLERANCES UNLESS OTHERWISE SPECIFIED

FRACTIONS DEC ANGLES

± ± ±

APPROVALS

DATE

DRAWN

1-8-82

CHECKED

Rev. A

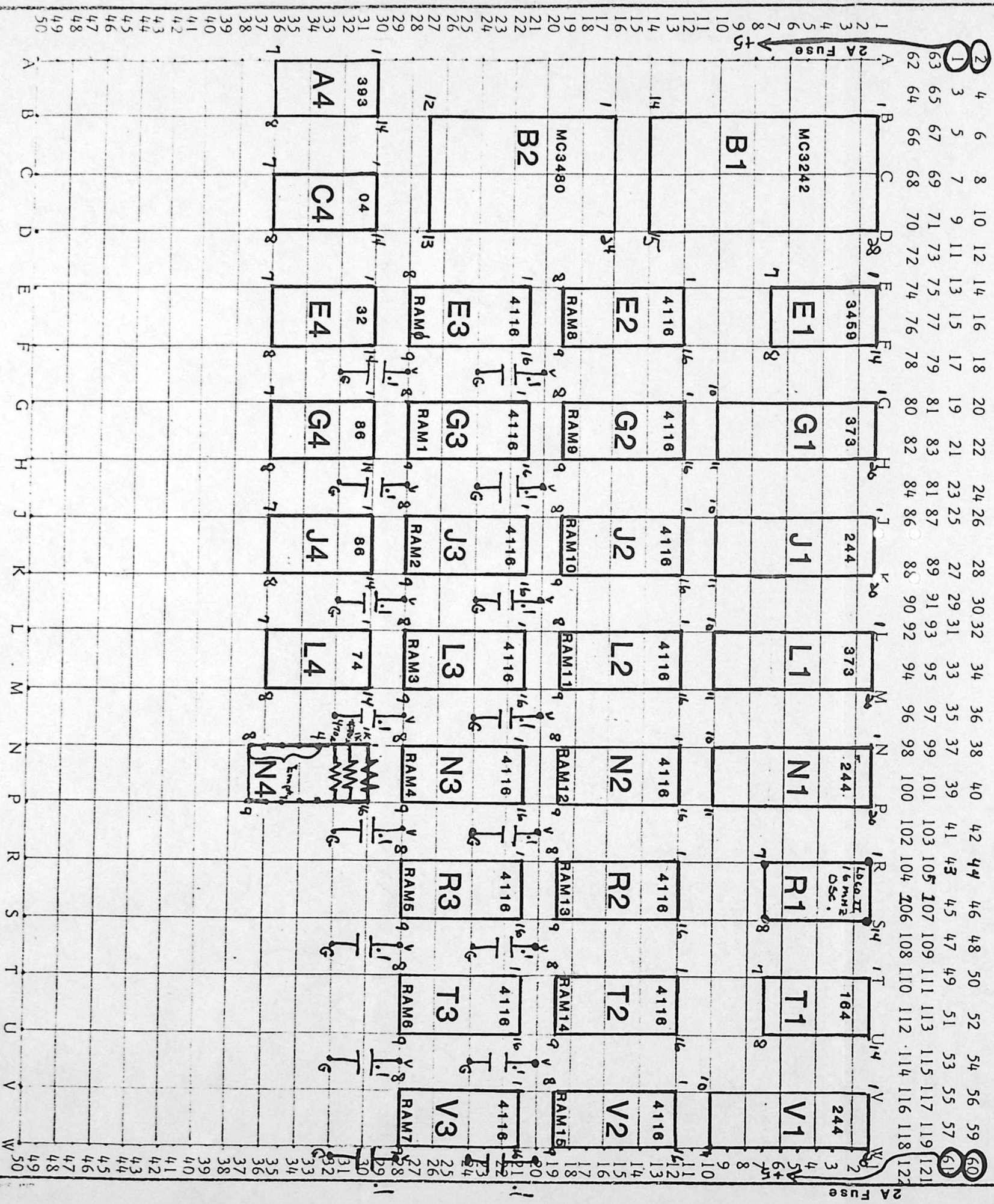
CIC-W-63A

SIZE B

DRAWING NO. 10814L1

DO NOT SCALE DRAWING

SHEET 2 of 5



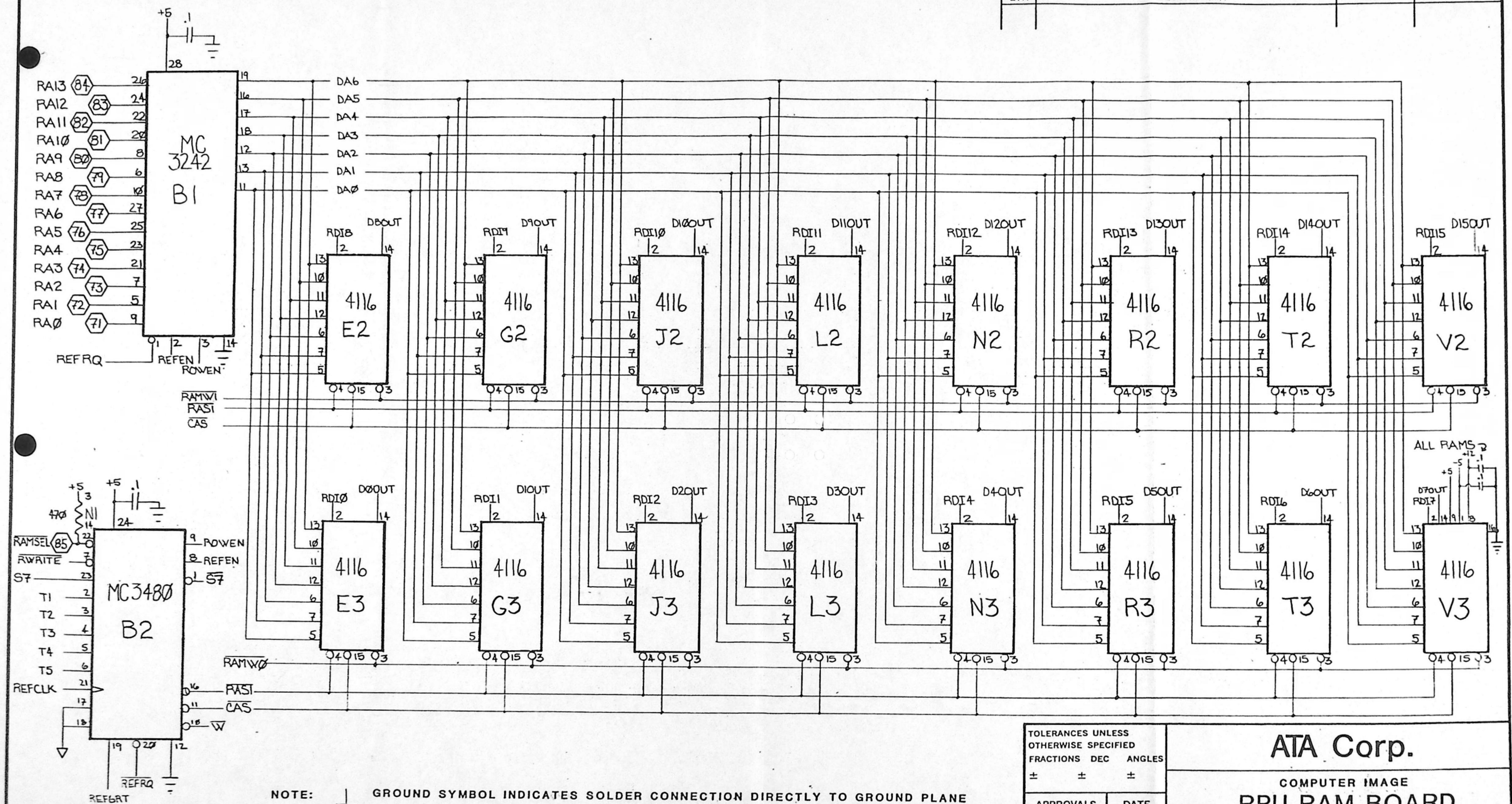
CIC-W-63

NOTE: This is COMPONENT side

Drawing number

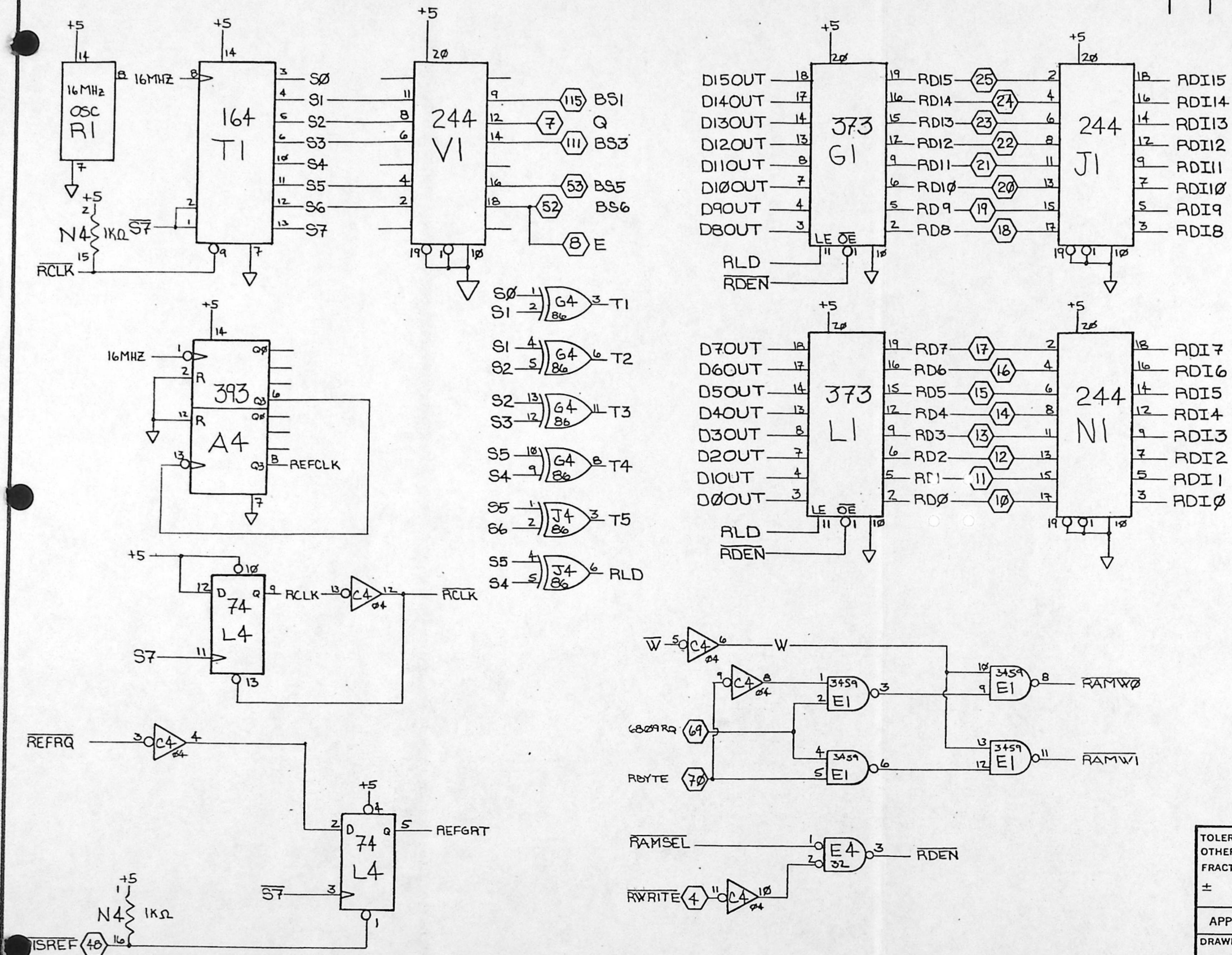
Assembly number

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

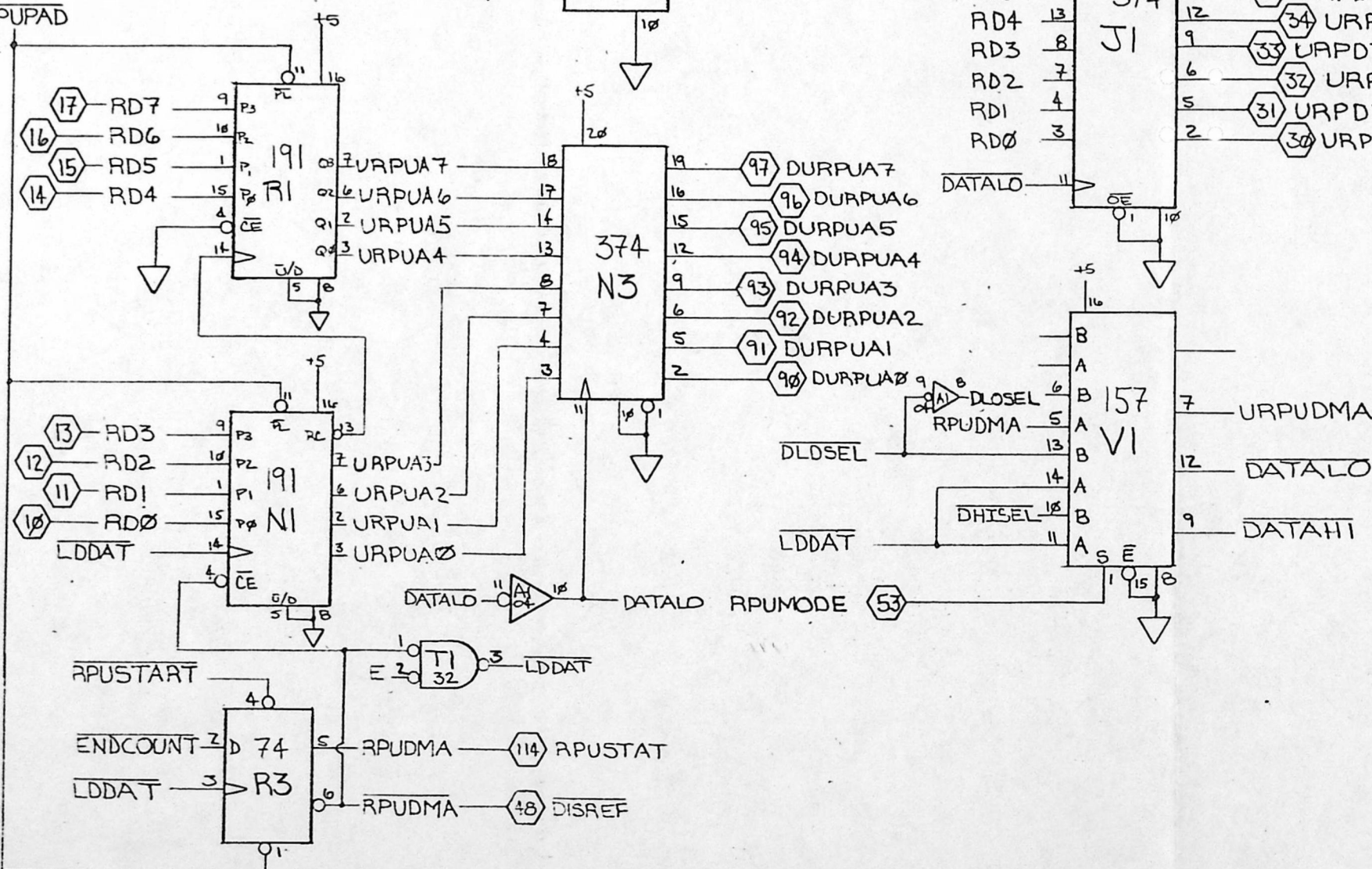
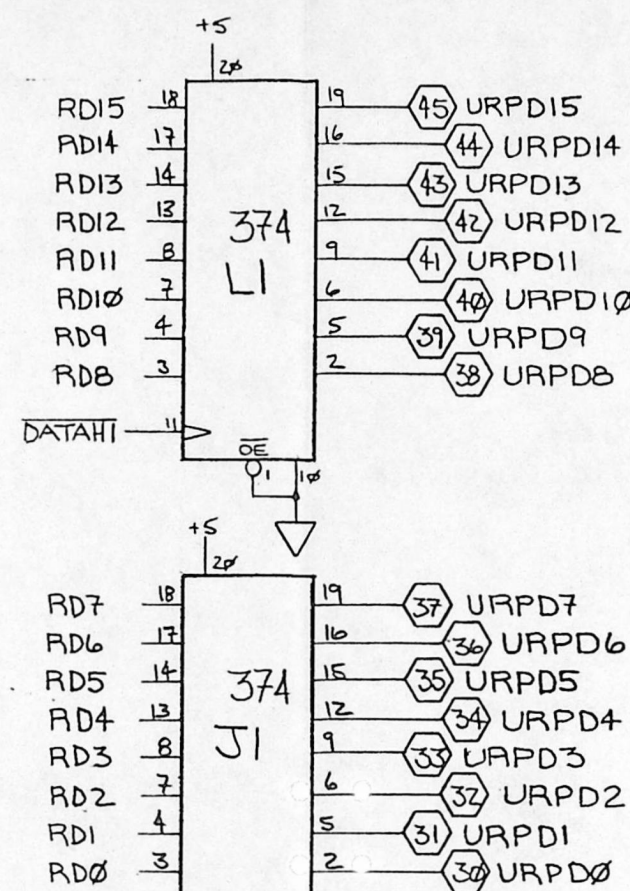
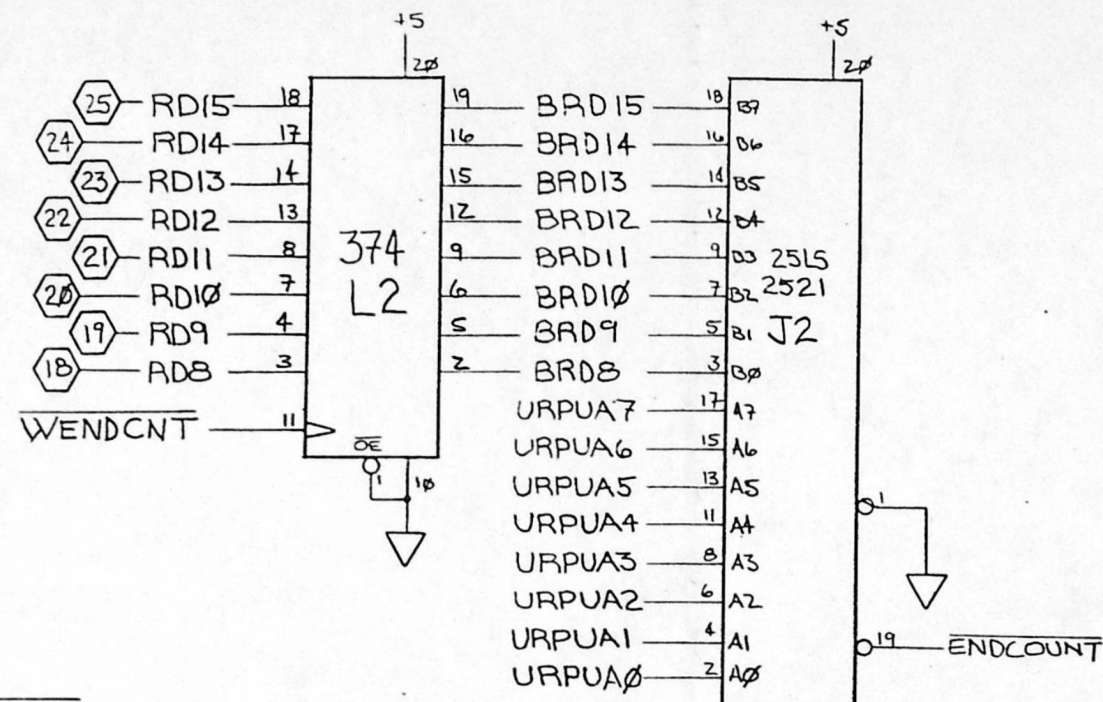


TOLERANCES UNLESS OTHERWISE SPECIFIED FRACTIONS DEC ANGLES ± ± ±		ATA Corp. COMPUTER IMAGE RPU RAM BOARD Ram & Controllers	
APPROVALS	DATE		
DRAWN LPD	8/13/81	CIC-W-63A	SIZE B DRAWING NO. 10814L1
CHECKED REV A	9/30/81		
DO NOT SCALE DRAWING		SHEET 4 of 5	

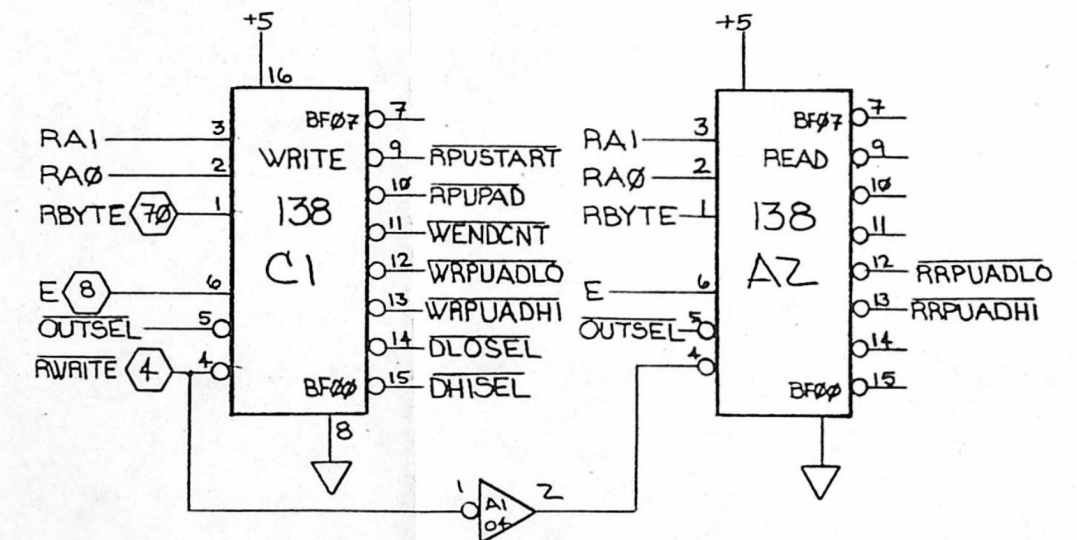
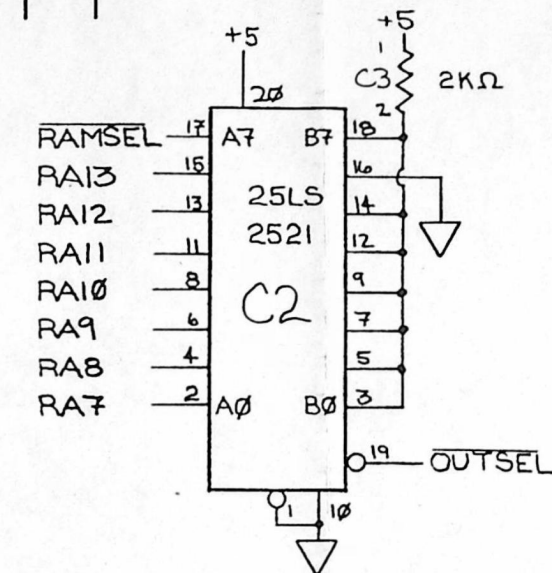
REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED



TOLERANCES UNLESS OTHERWISE SPECIFIED			
FRACTIONS	DEC	ANGLES	
±	±	±	
ATA Corp. COMPUTER IMAGE RPU RAM BOARD Data Buffers & Control			
APPROVALS	DATE	CIC-W-63A	
DRAWN LPD	8/14/81		
CHECKED	9/30/81	SIZE B	DRAWING NO. 10814L1
REV A		DO NOT SCALE DRAWING	
		SHEET 5 of 5	



REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED



TOLERANCES UNLESS
OTHERWISE SPECIFIED
FRACTIONS DEC ANGLES
± ± ±

APPROVALS DATE
DRAWN LPD 7/28/81
CHECKED REV A 10/1/81

ATA CORP.

COMPUTER IMAGE

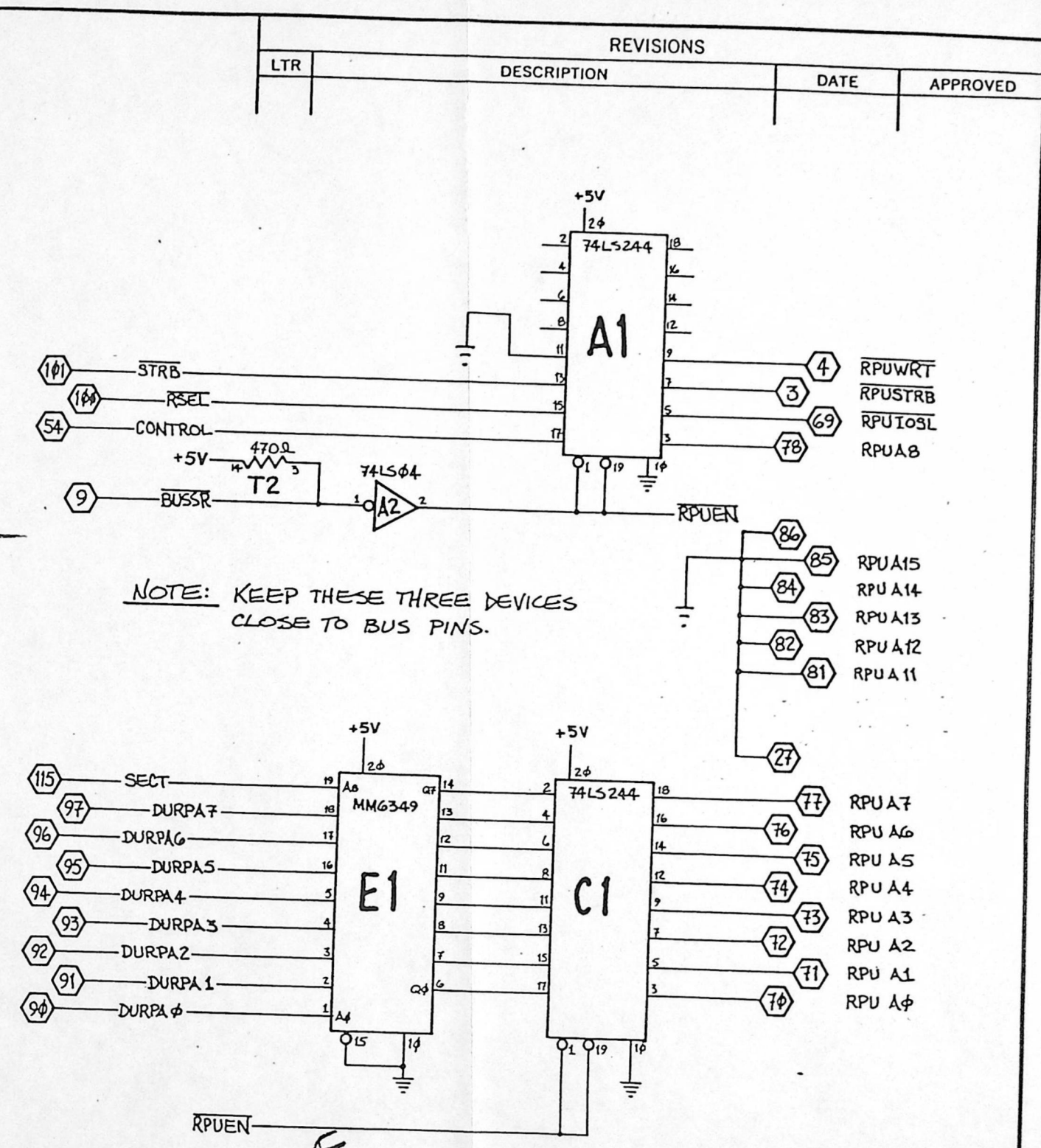
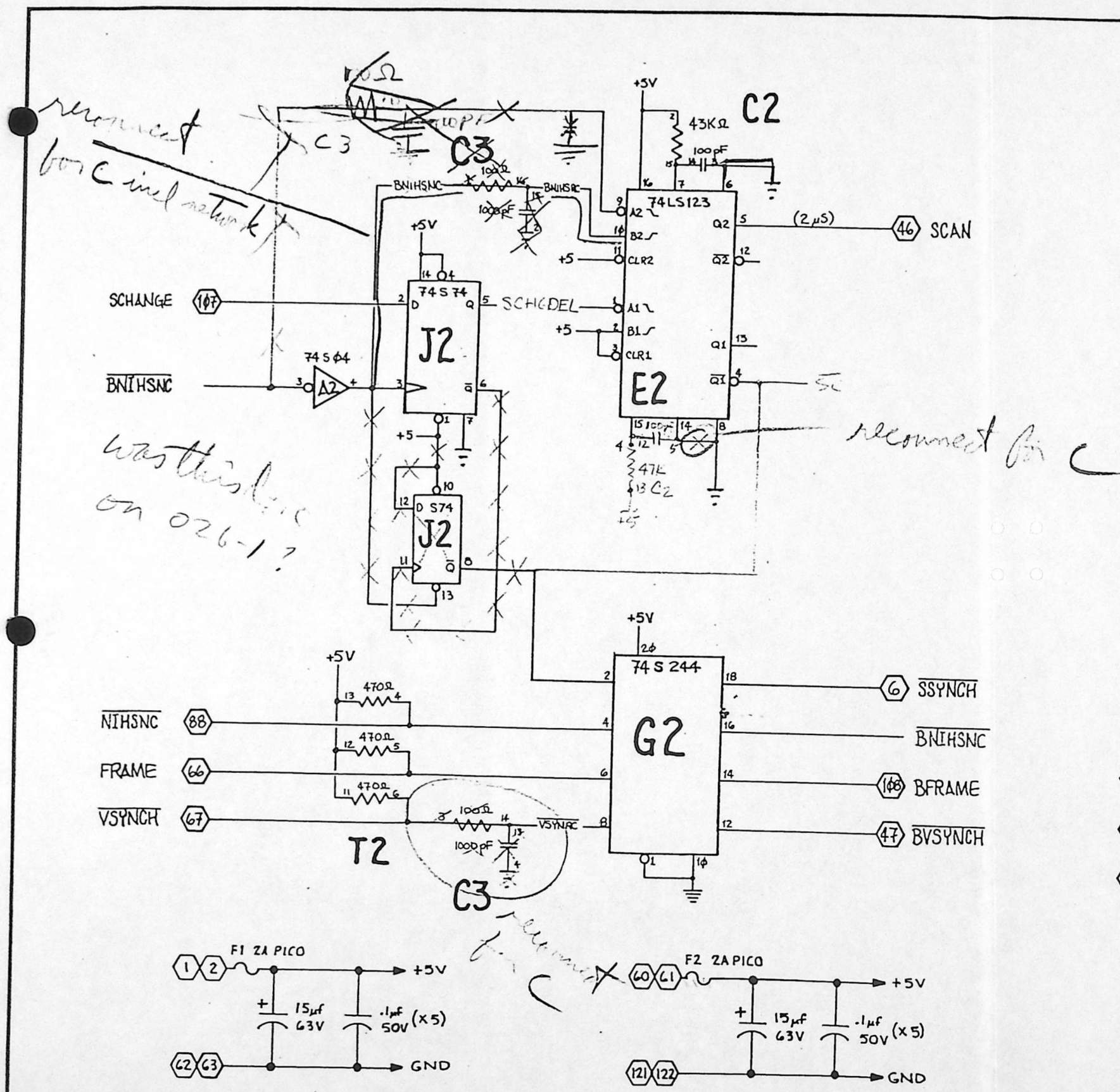
RPU OUTPUT CARD

Parameter Address

SIZE DRAWING NO.
CIC-W-64 B 10728L1

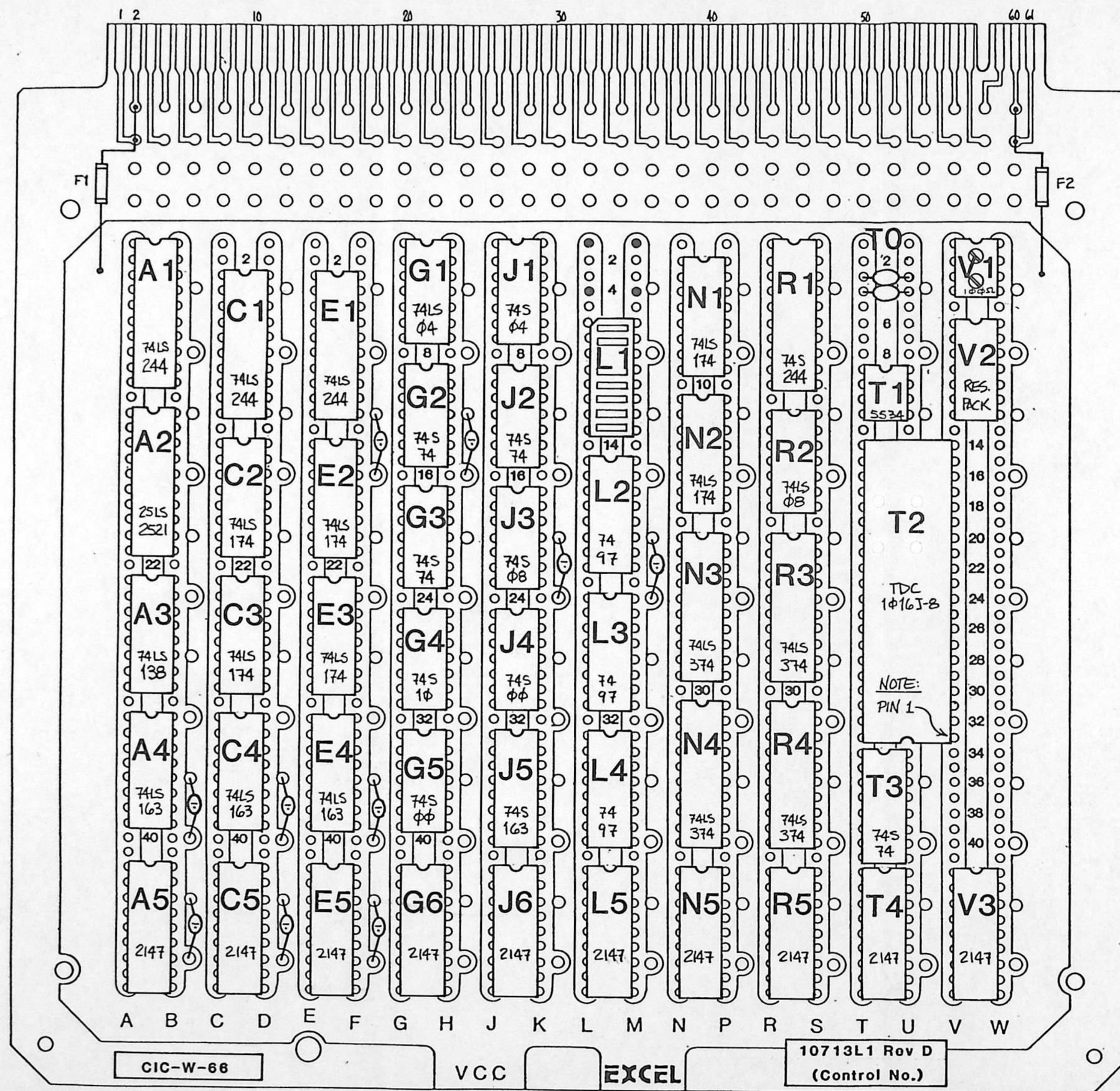
DO NOT SCALE DRAWING

SHEET 4 of 5



REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

ATA Corp.			
COMPUTER IMAGE			
RPU DRIVER CARD			
ADDRESSING & CONTROL			
APPROVALS	DATE	SCALE	SIZE
DRAWN	SEP. 4-13-82		B
CHECKED			
		DRAWING NO.	
		CIC-W-65	
DO NOT SCALE DRAWING		SHEET 1 OF 2	



REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

PARTS LIST

Qty.	P/N	Description	Ref.
3	74LS244	Octal Buffer	A1,C1,E1
1	25LS2521	8-Bit Comparator	A2
1	74LS138	1-of-8 Decoder	A3
3	74LS163	Synchronous 4-Bit Counter	A4,C4,E4
10	2147H-2	4K x 1-Bit RAM, Intel	A5,C5,E5,G6, J6,L5,N5,R5, T4,V3
6	74LS174	Hex D-Type Flip-Flop	C2,C3,E2,E3, N1,N2
1	74LS04	Hex Inverter	G1
4	74S74	Dual D-Type Flip-Flop	G2,G3,J2,T3
1	74S10	Triple 3-in NAND Gate	G4
2	74S00	Quad 2-in NAND Gate	G5,J4
1	74S04	Hex Inverter	J1
2	74LS08	Quad 2-in AND Gate	J3,R2
1	74S163	Synchronous 4-Bit Counter	J5
1		8PST Dip-Switch	L1
3	7497	Synch, 6-Bit Binary Rate-Multiplier	L2,L3,L4
4	74LS374	T.S. Octal Latch	N3,N4,R3,R4
1	74S244	Octal Buffer	R1
1	NE5534AN	Video Amp, Signetics	T1
1	TDC1016J-8	D/A Converter (Put In At Test)	T2
1	7102B-210-101	100 Ohm Potentiometer, Bourns	V1
1		14-Pin Header	V2
1		Resistor, 9350 Ohm, 1%, 1/4W	(1-14)
1		Resistor, 681 Ohm, 1%, 1/4W	(2-13)
1		Resistor, 3320 Ohm, 1%, 1/4W	(3-12)
1		Resistor, 4990 Ohm, 1%, 1/4W	(4-11)
1		Resistor, 160 Ohm, 5%, 1/4W	(5-10)
1		Resistor, 51 Ohm, 5%, 1/4W	(6-9)
1		Capacitor, 27 picofarad	(J5-2)
4		Capacitor, 1 microfarad	T0,(T2-10, -9,-2)
3		Capacitor, 4.7 microfarad, Tant.	
26		Capacitor, 0.1 microfarad	(Bypass)
2		Picofuse, 2Amp	F1,F2
1	4520-T1	W.W. Board, Excel	

TOLERANCES UNLESS
OTHERWISE SPECIFIED
FRACTIONS DEC ANGLES
± ± ±

APPROVALS DATE
DRAWN SEP 4/29/82
CHECKED

ATA Corp.

COMPUTER IMAGE
FUNCTION GENERATOR

Board Layout

CIC-W-66

SIZE B DRAWING NO. 10713L1

DO NOT SCALE DRAWING

SHEET 2 of 5

COMPONENT SIDE

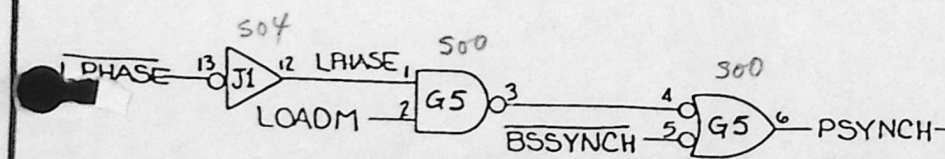
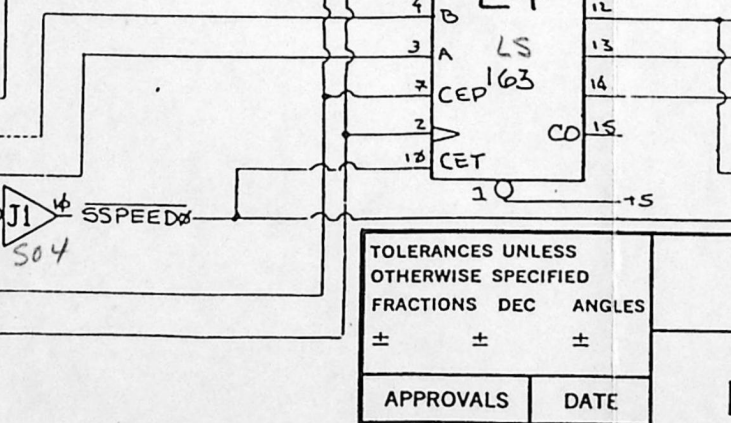
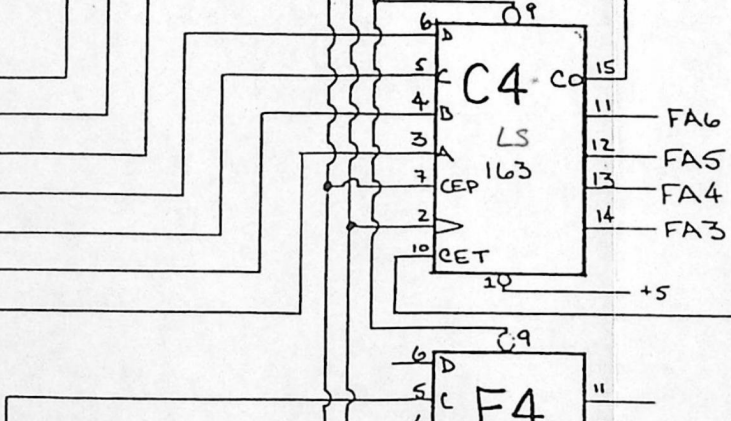
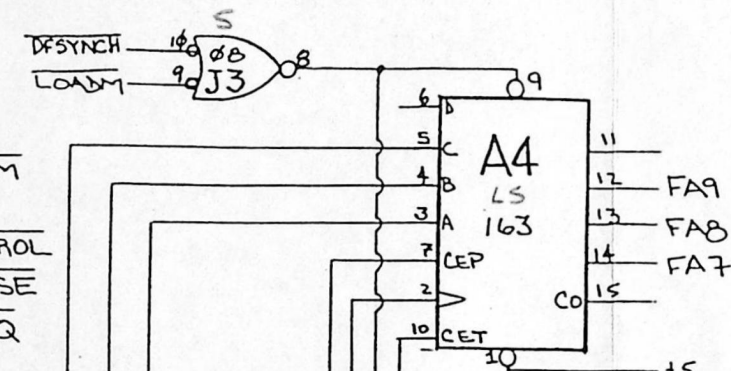
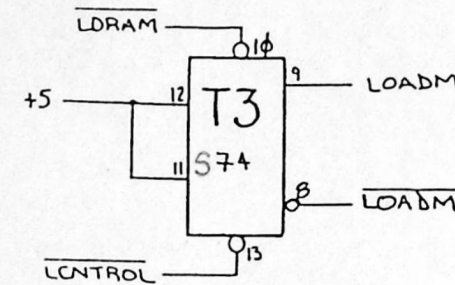
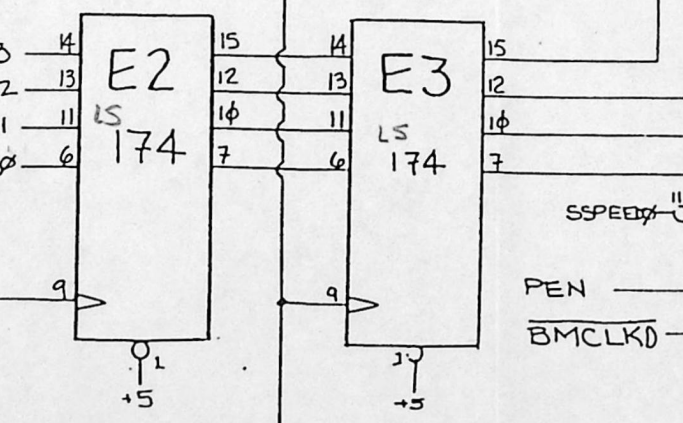
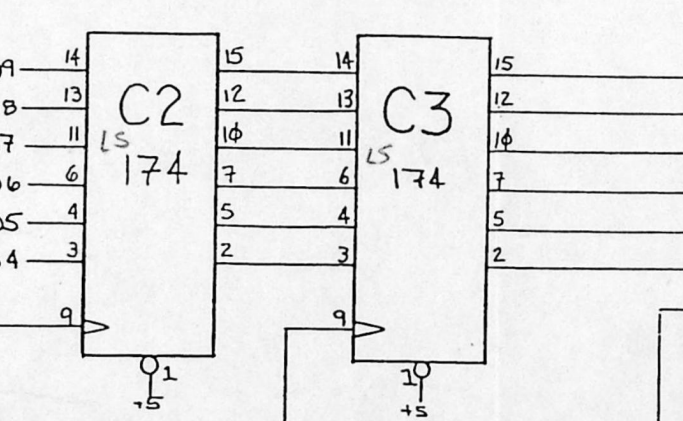
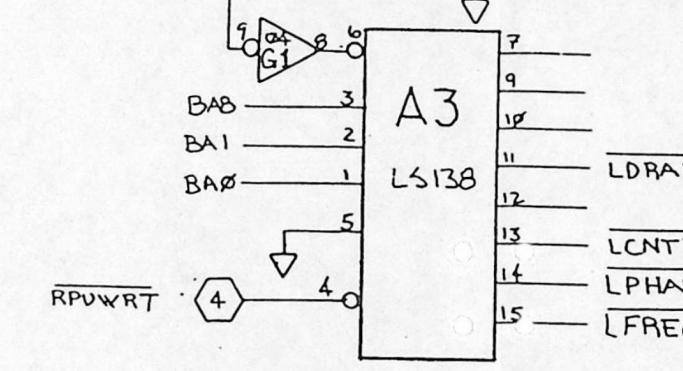
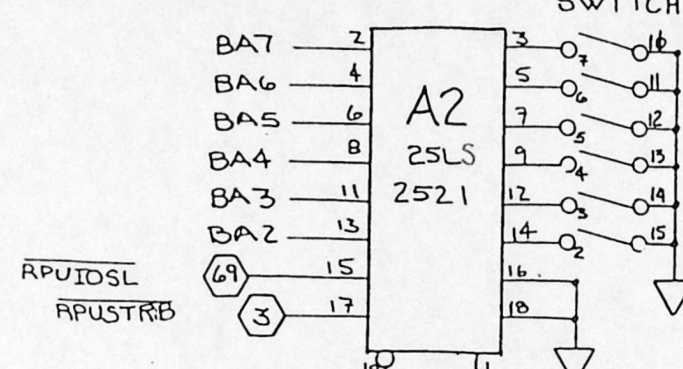
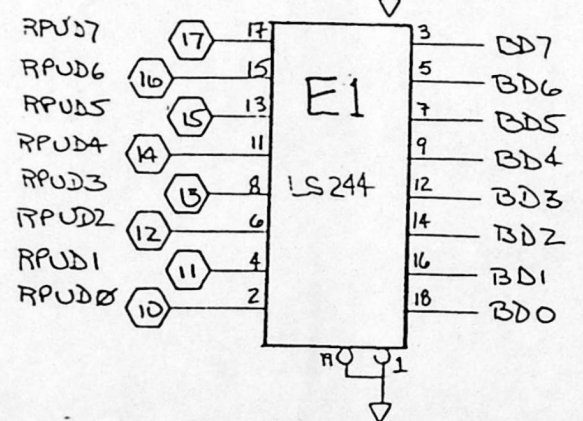
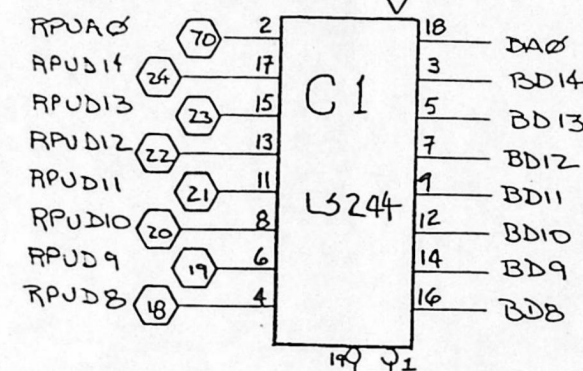
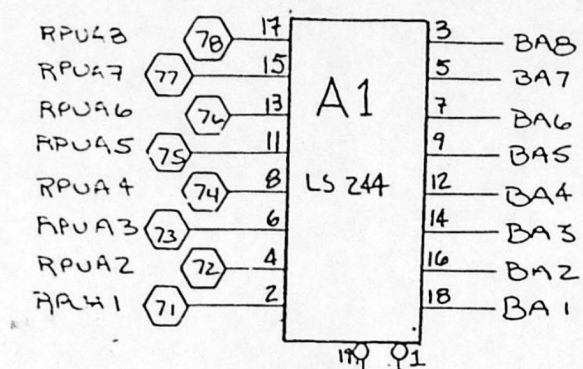
NOTE: DO NOT REMOVE FOUR
PINS AT LOCATION
ABOVE L1.

CIC-W-66

VCC

EXCEL

10713L1 Rev D
(Control No.)



REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

TOLERANCES UNLESS OTHERWISE SPECIFIED
FRACTIONS DEC ANGLES
± ± ±

APPROVALS	DATE
DRAWN SP/LD	4-21-82
CHECKED REV D	4-28-82

ATA Corp.

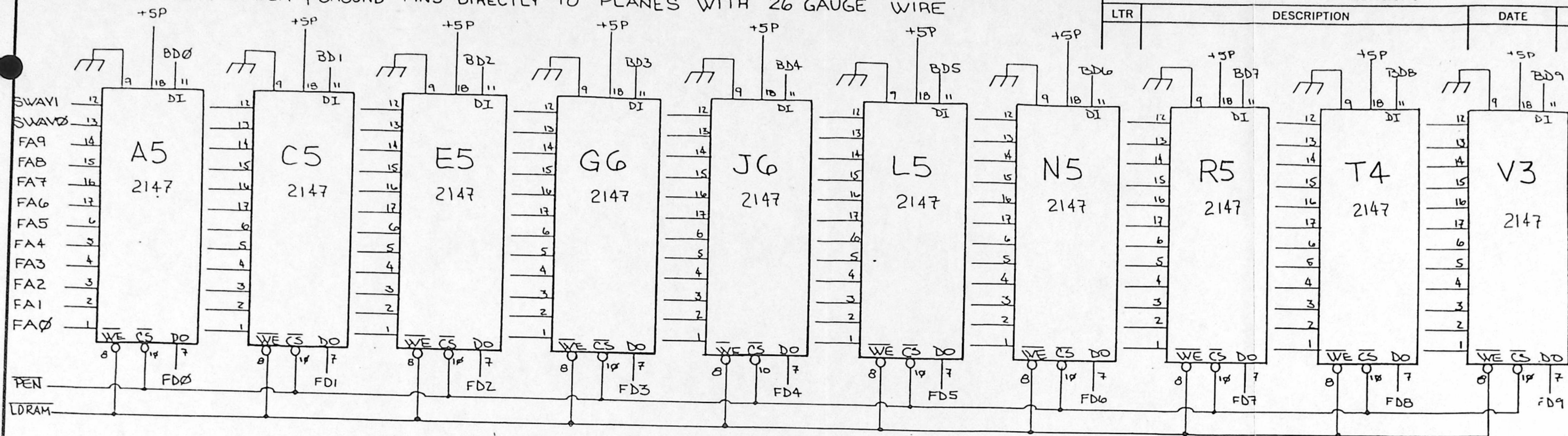
COMPUTER IMAGE
FUNCTION GENERATOR
Buffers & Address Generator

CIC-W-66 **B** 10713L1

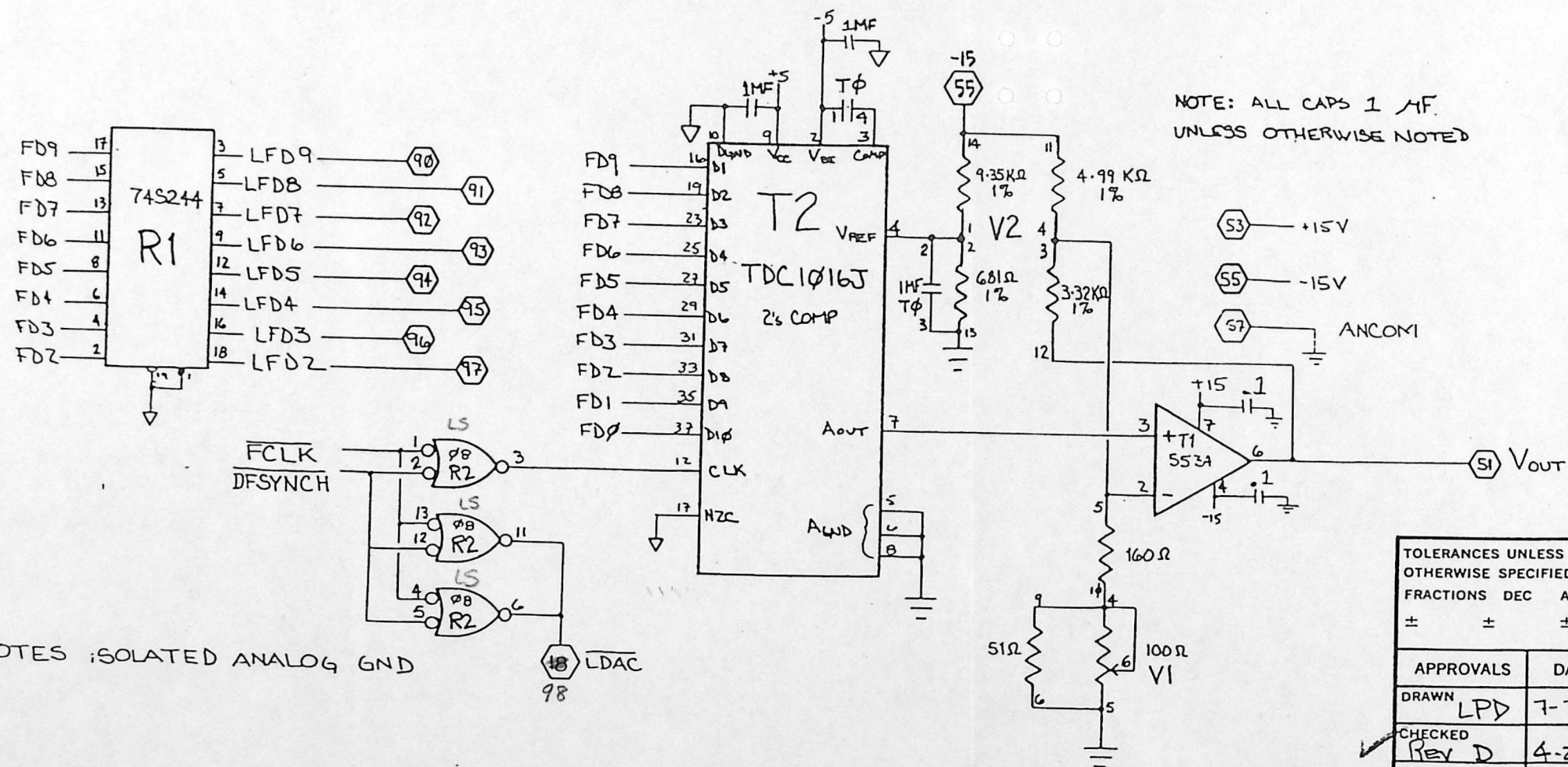
DO NOT SCALE DRAWING SHEET 3 of 5

P/N CIC-W-66

NOTE: CONNECT RAM POWER & GROUND PINS DIRECTLY TO PLANES WITH 26 GAUGE WIRE



LTR	REVISIONS		DATE	APPROVED
	DESCRIPTION			



NOTE: ALL CAPS 1 MF
UNLESS OTHERWISE NOTED

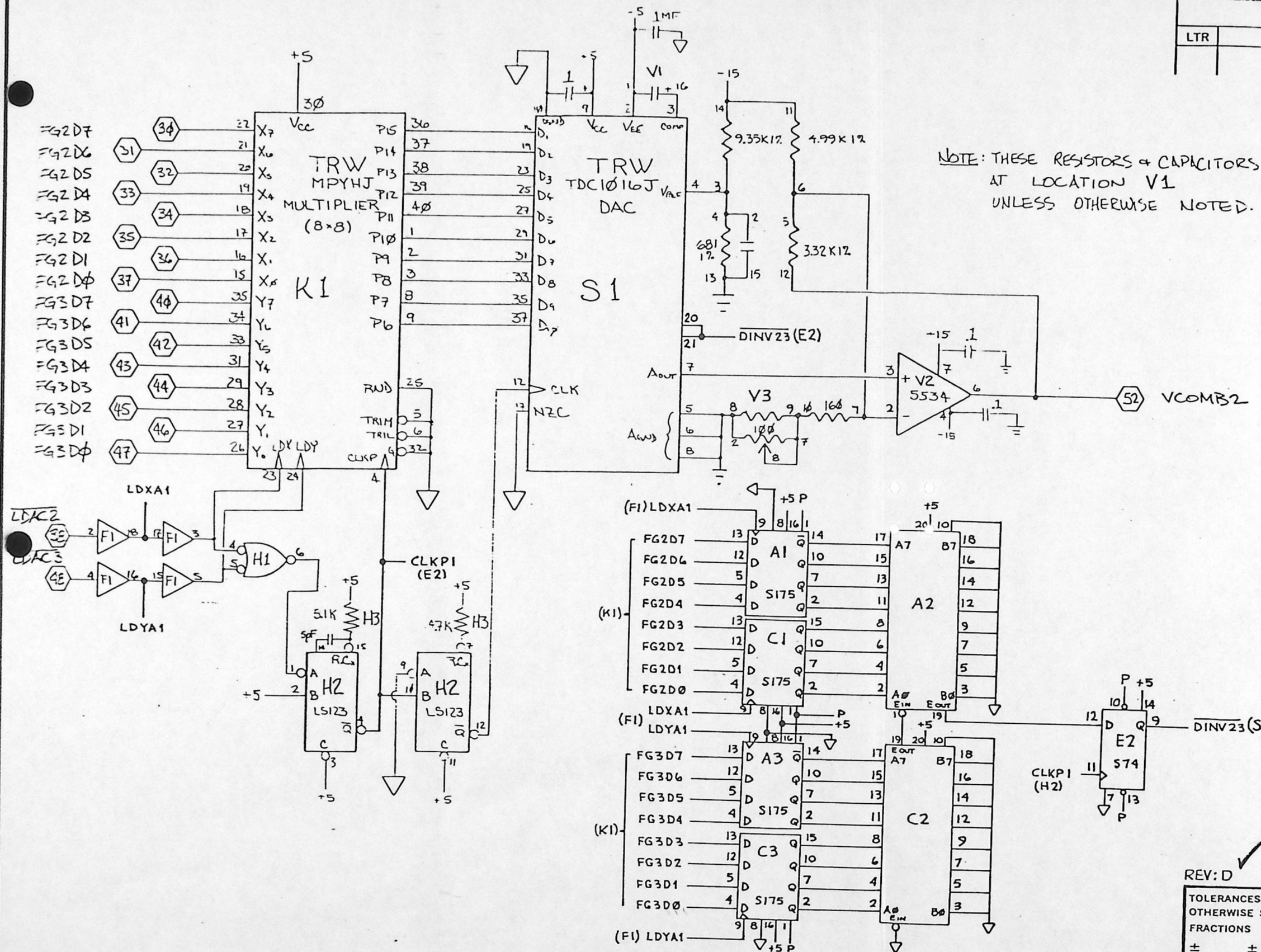
V2	
1	9.35K Ω - 1%
2	681 Ω - 1%
3	3.32K Ω - 1%
4	4.99K Ω - 1%
5	160 Ω - 5%
6	51 Ω - 5%
7	(N.C.)
8	(NO CONNECTION)
ALL 1/4 W	

NOTE: $\frac{1}{2}$ DENOTES ISOLATED ANALOG GND

P/N CIC-W-66

ATA Corp.			
COMPUTER IMAGE FUNCTION GENERATOR			
D/A Output & WFM Storage			
APPROVALS		DATE	
DRAWN LPD		7-7-81	
CHECKED Rev D		4-28-82	
CIC-W-66		SIZE B	DRAWING NO. 10713L1
DO NOT SCALE DRAWING			SHEET 4 of 5

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

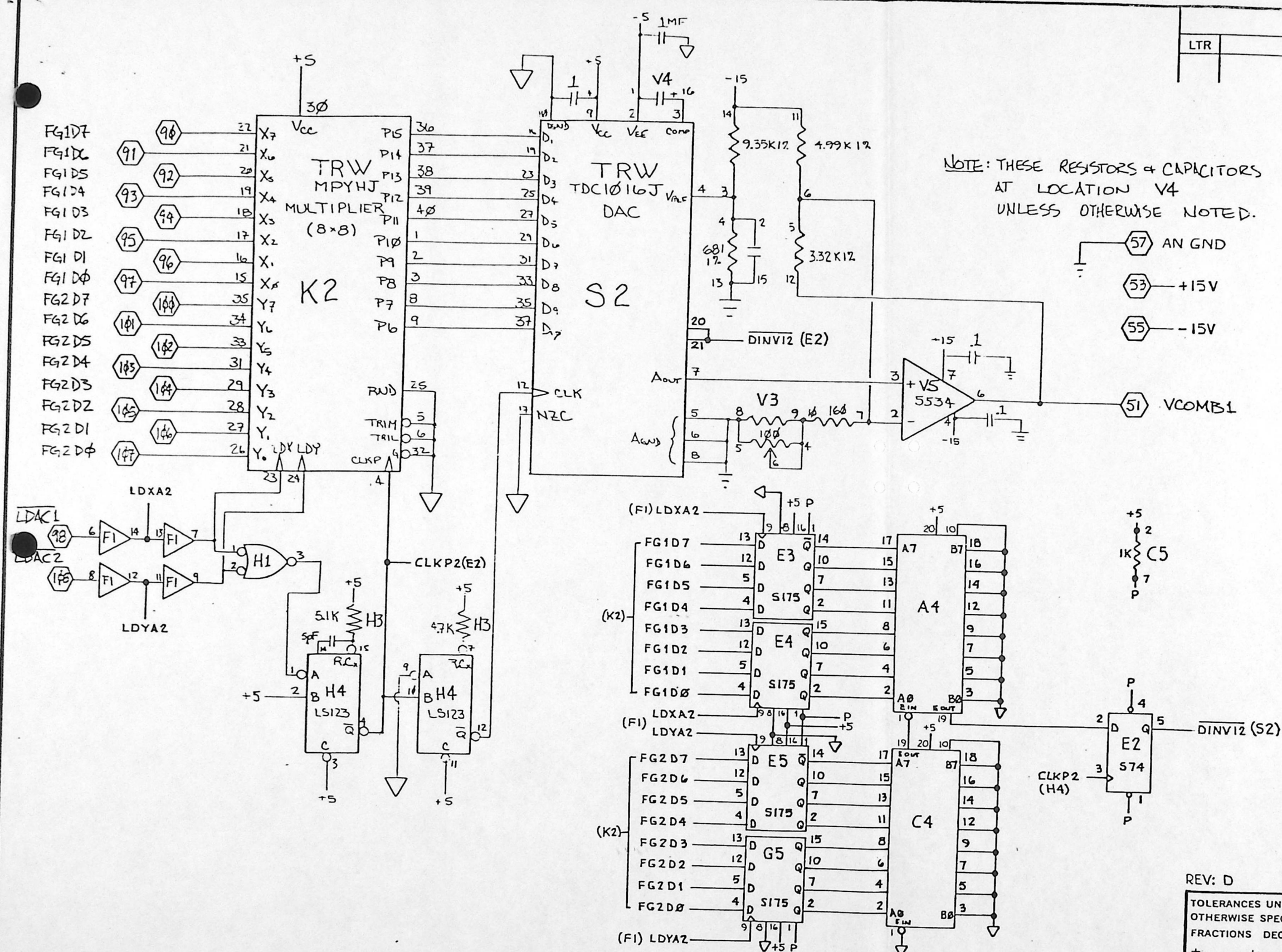


NOTE: $\frac{1}{2}$ DENOTES ISOLATED ANALOG GROUND

REV: D

ATA CORP.			
COMPUTER IMAGE			
F.G. COMBINER BOARD			
FG2 x FG3			
APPROVALS	DATE	SCALE	SIZE
DRAWN LPD	7-24-81		B
CHECKED			DRAWING NO.
REV. C	4-8C		CIC-W-67
DO NOT SCALE DRAWING			SHEET 1 OF 2

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED



NOTE: THESE RESISTORS + CAPACITORS
AT LOCATION V4
UNLESS OTHERWISE NOTED.

57 AN GND
53 +15V
55 -15V
51 VCOMB1

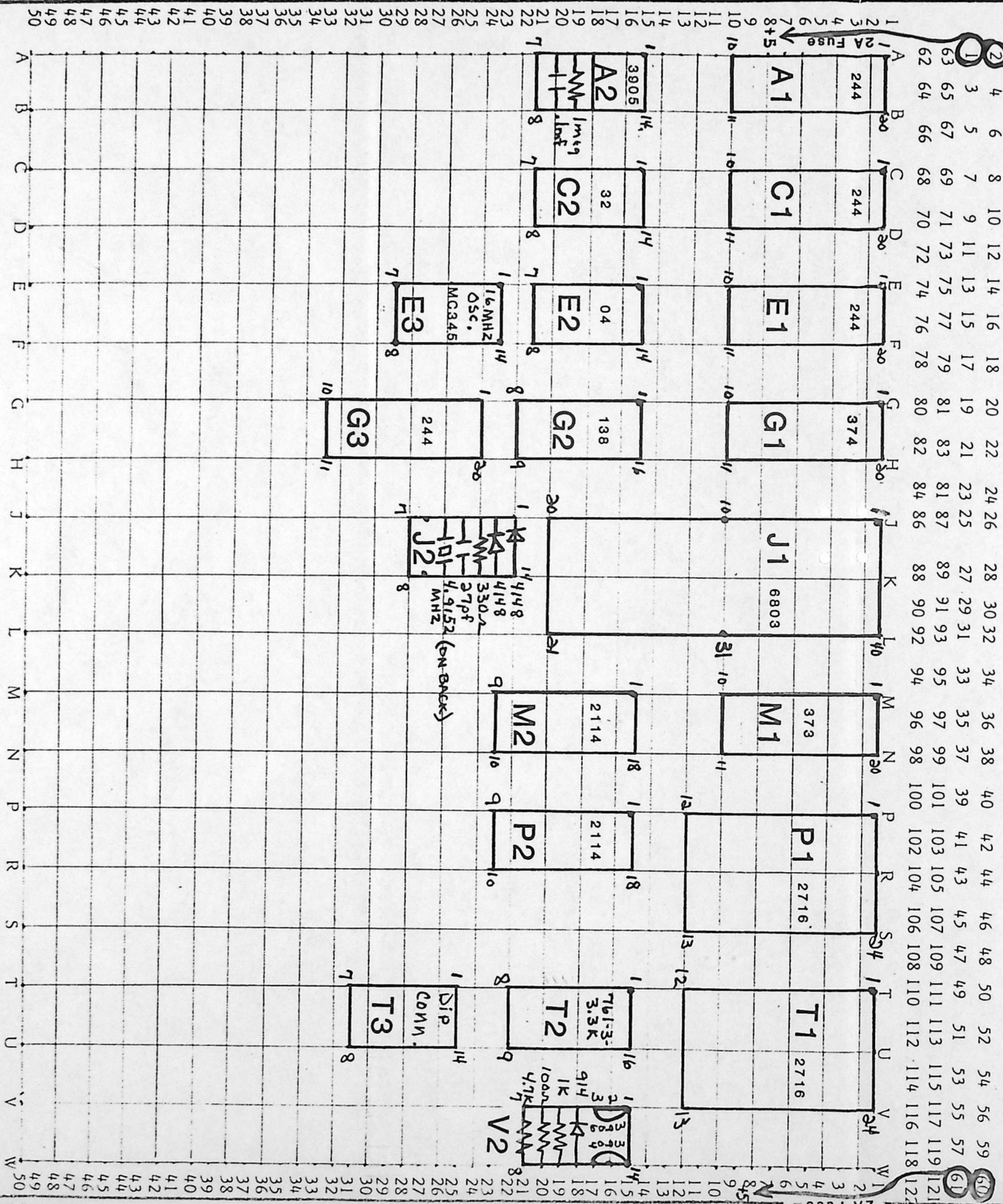
NOTE: $\frac{1}{\square}$ DENOTES ISOLATED ANALOG GROUND

REV: D	
TOLERANCES UNLESS OTHERWISE SPECIFIED FRACTIONS DEC ANGLES ± ± ±	
ATA CORP.	
COMPUTER IMAGE	
F.G. COMBINER BOARD	
FG1 x FG2	
APPROVALS	DATE
DRAWN LPD	7-26-81
CHECKED	
REV. C	4-82
SCALE	
SIZE B	DRAWING NO. CIC-W-67
DO NOT SCALE DRAWING	
SHEET 2 OF 2	

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

DESIGNATION	QTY.	PART #	MFG.	REMARKS
A1,C1,E1,G3	4	74LS244		TTL
G1	1	74LS374		TTL
M1	1	74LS373		TTL
J1	1	MC6803	Motorola	
P1,T1	2	MK2716J8	Intel	Eprom
E2	1	74LS04		TTL
C2	1	74LS32		TTL
E3	1	MC345	Motorola	Loco II 16Mhz Oscillator
A2	1	LM3905		Timer
M2,P2	2	MM2114	Monolithic	Ram
J2	2	IN4148		Diode
V2-4	1	IN914		Diode
V2-1	1	2N3906	Motorola	Transistor
V2-14	1	2N3904	Motorola	Transistor
A2-5	1			1/4Watt 1M Ohm Resistor
V2-7	1			4.7K
J2-3	1			330 Ohm
V2-5	1			1K
V2-6	1			100 Ohm
J2-4	1			27pf Capacitor
A2-6	1			.1uf Capacitor
J2-5	1			4.9152Mhz Crystal
	2			2 Amp Pico Fuse
	2			4.7uf Capacitor
V2,J2	2			14 Pin Header
G2	1	74LS138		
T2	1	761-3-3.3K		
T3	1			

TOLERANCES UNLESS OTHERWISE SPECIFIED		FRACTIONS DEC ANGLES	
±	±	±	±
APPROVALS		DATE	
DRAWN		1-13-82	
CHECKED		Rev.A	
CIC-W-68		SIZE B	DRAWING NO. 11013W1
DO NOT SCALE DRAWING		SHEET 2 of 5	



CIC-W-68

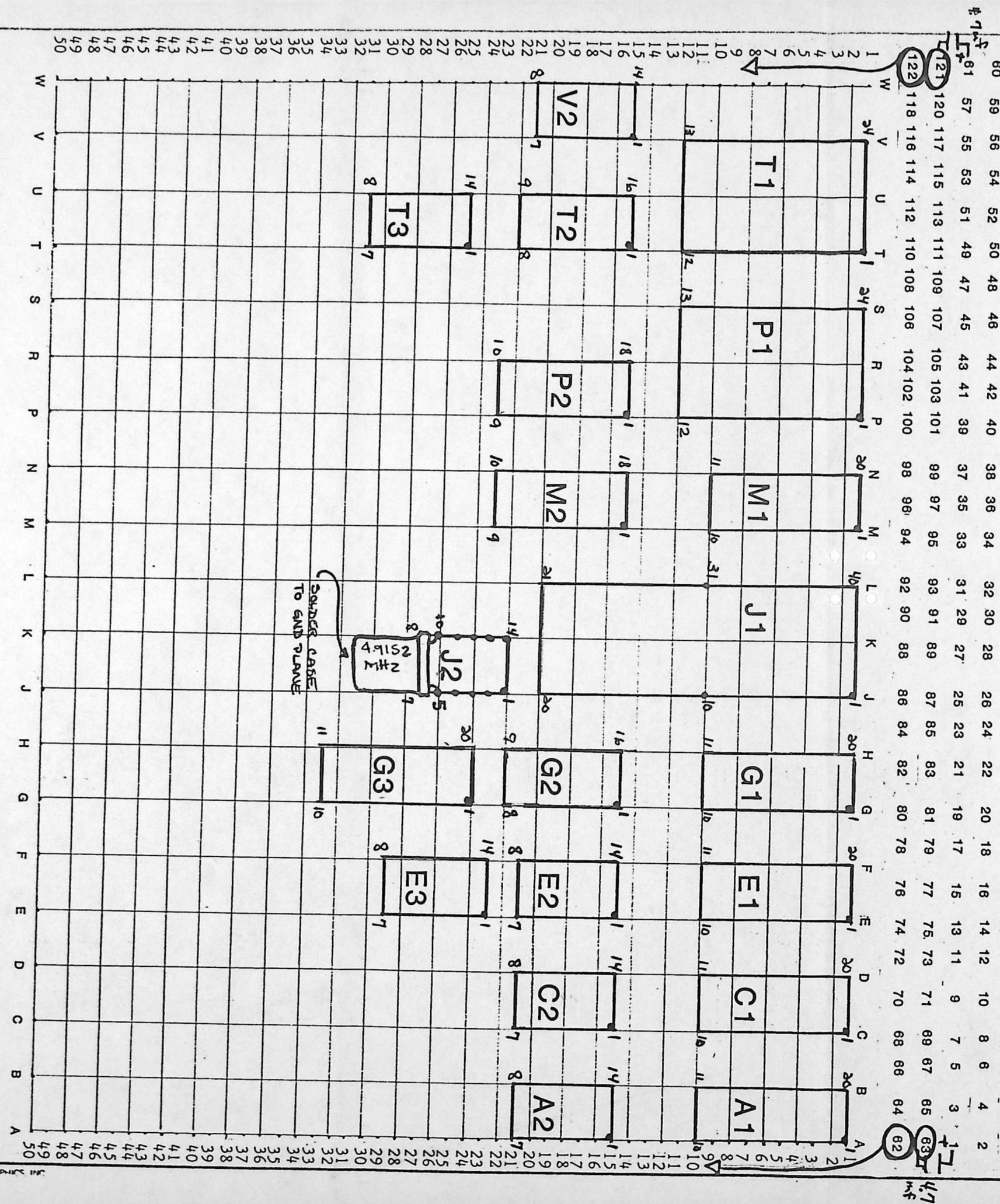
NOTE: This is COMPONENT side

Drawing number
Assembly number

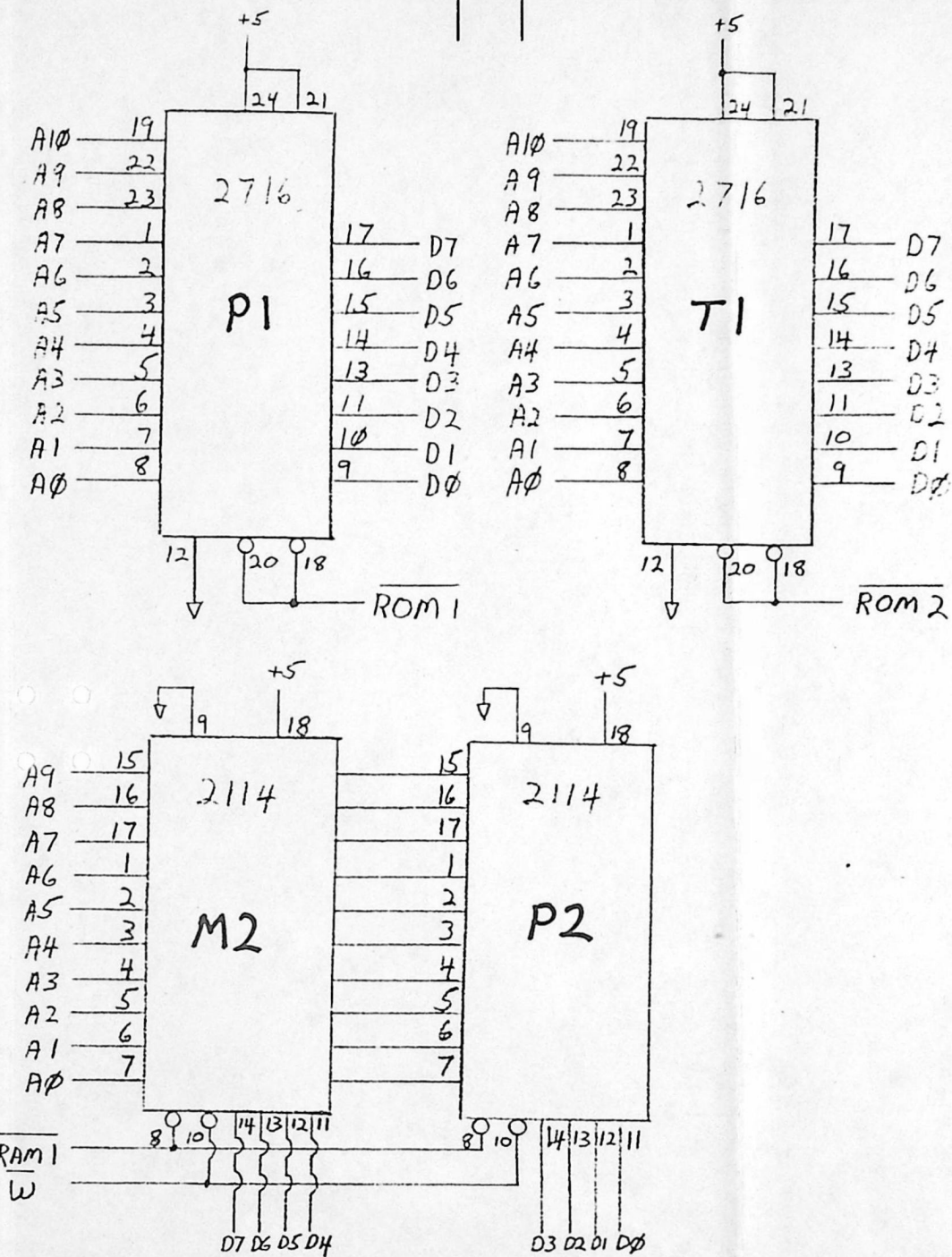
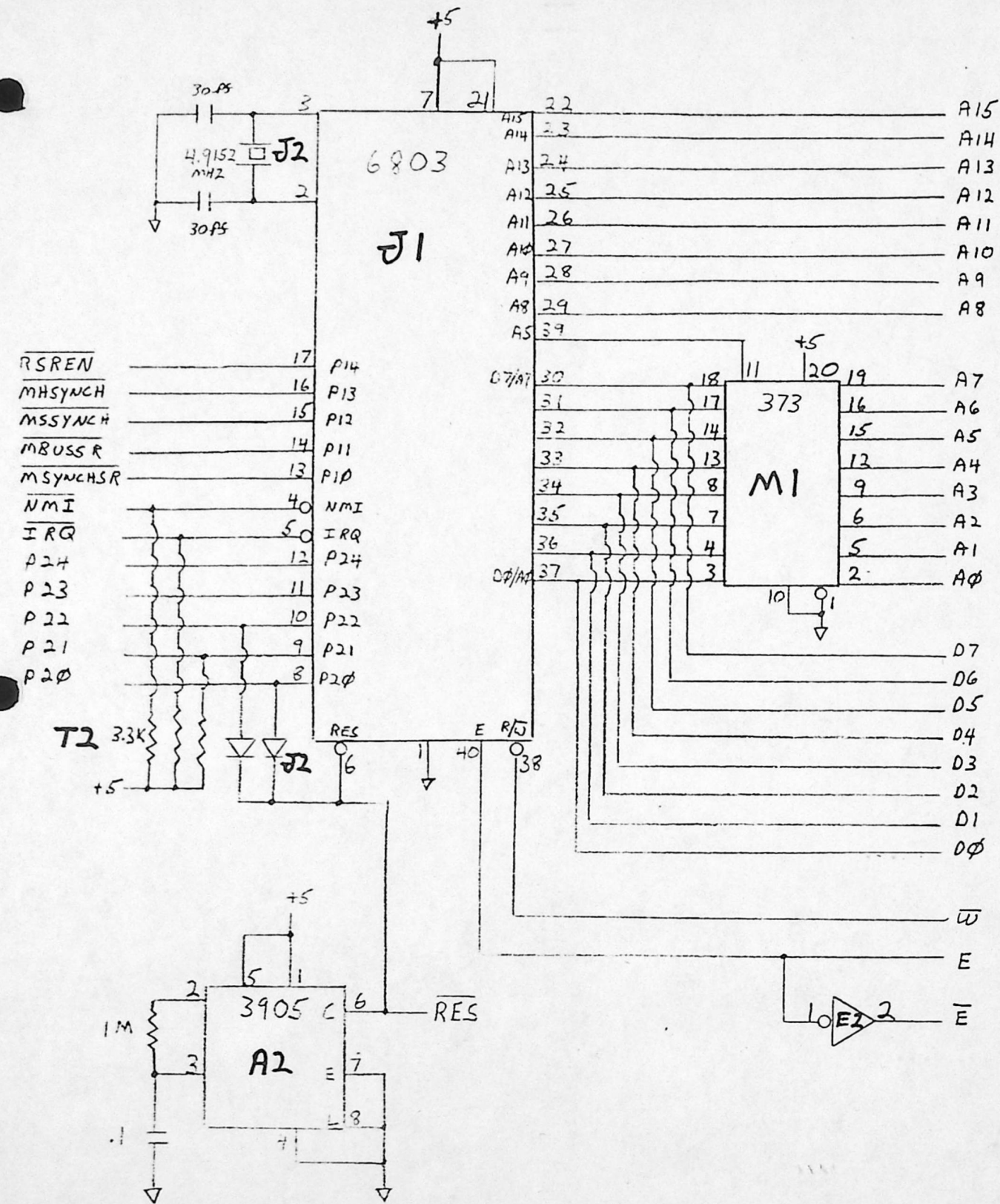
REVISIONS			
APPROVED	DATE	DESCRIPTION	LTR

TOLERANCES UNLESS OTHERWISE SPECIFIED			
FRACTIONS	DEC	ANGLES	
±	±	±	
APPROVALS	DATE		
DRAWN	1-13-82		
CHECKED	Rev.A		

ATA Corp.			
COMPUTER IMAGE			
RPU EXERCISOR			
Board Layout			
CIC-W-68	SIZE B	DRAWING NO.	11013W1
DO NOT SCALE DRAWING			SHEET 3 of 5



NOTE: This is PIN side

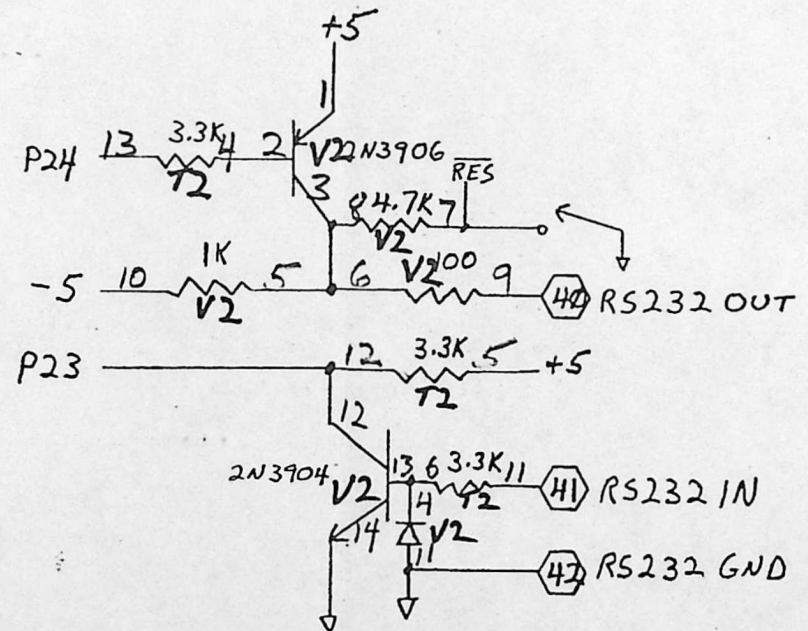
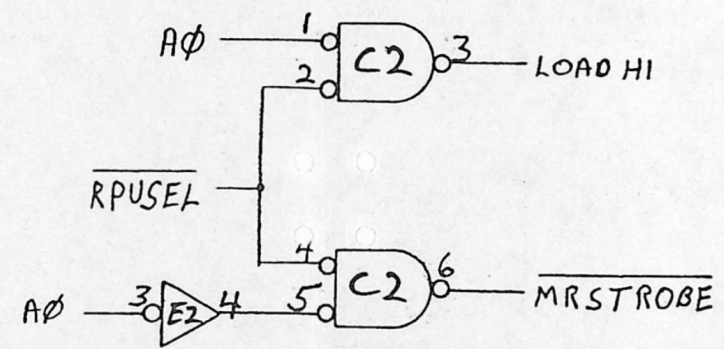
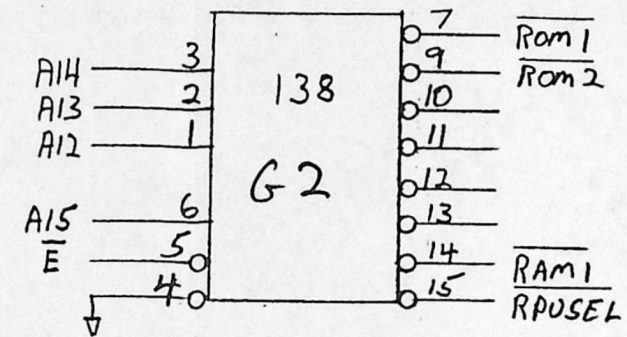
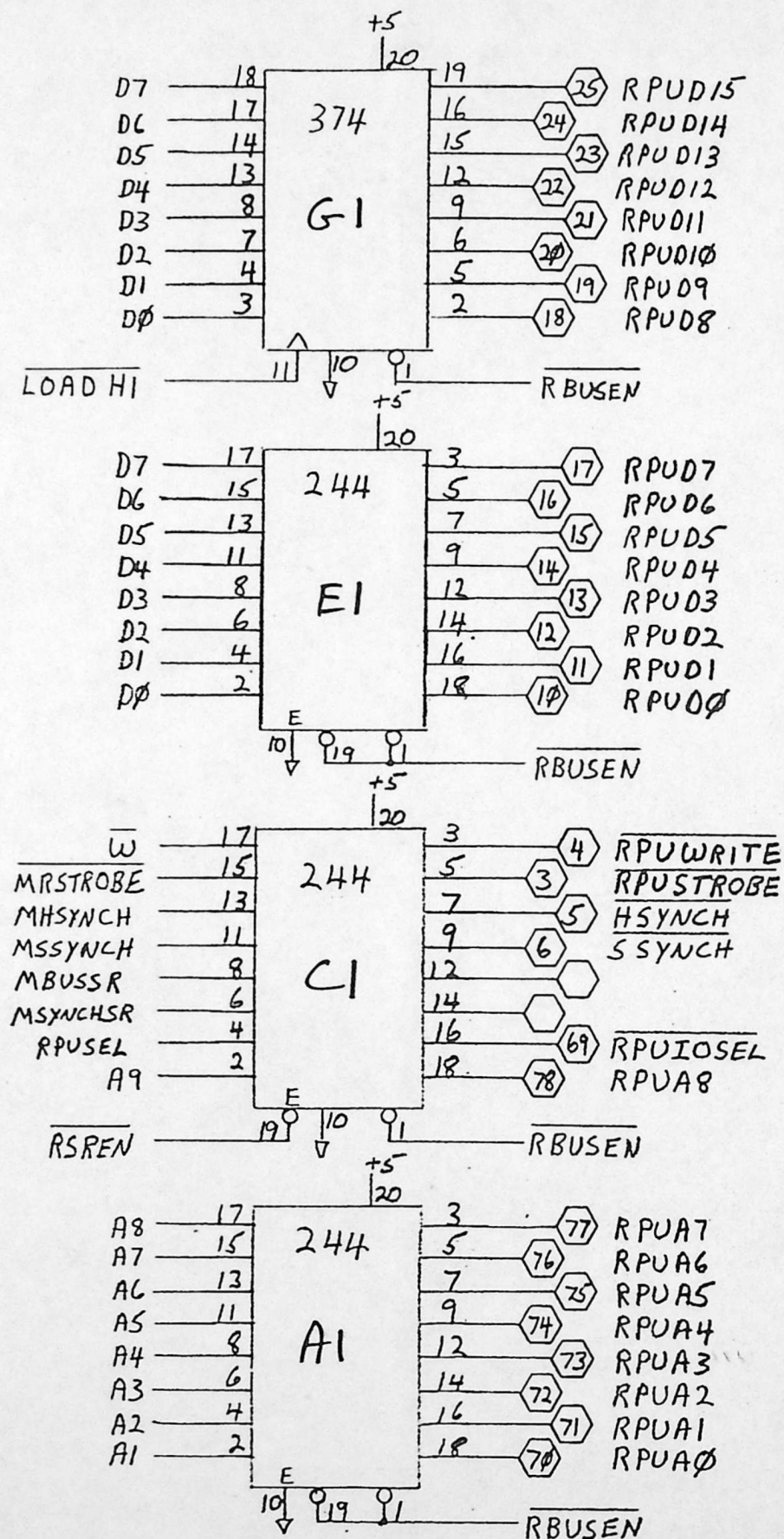


REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

TOLERANCES UNLESS OTHERWISE SPECIFIED	
FRACTIONS	DEC ANGLES
±	± ±

APPROVALS	DATE
DRAWN DW	9/15/81
CHECKED REV A	

ATA Corp.	
COMPUTER IMAGE	
RPU EXERCISER	
CPU & MEMORY	
CIC-W-68	SIZE B
DO NOT SCALE DRAWING	DRAWING NO.
SHEET 4 of 5	

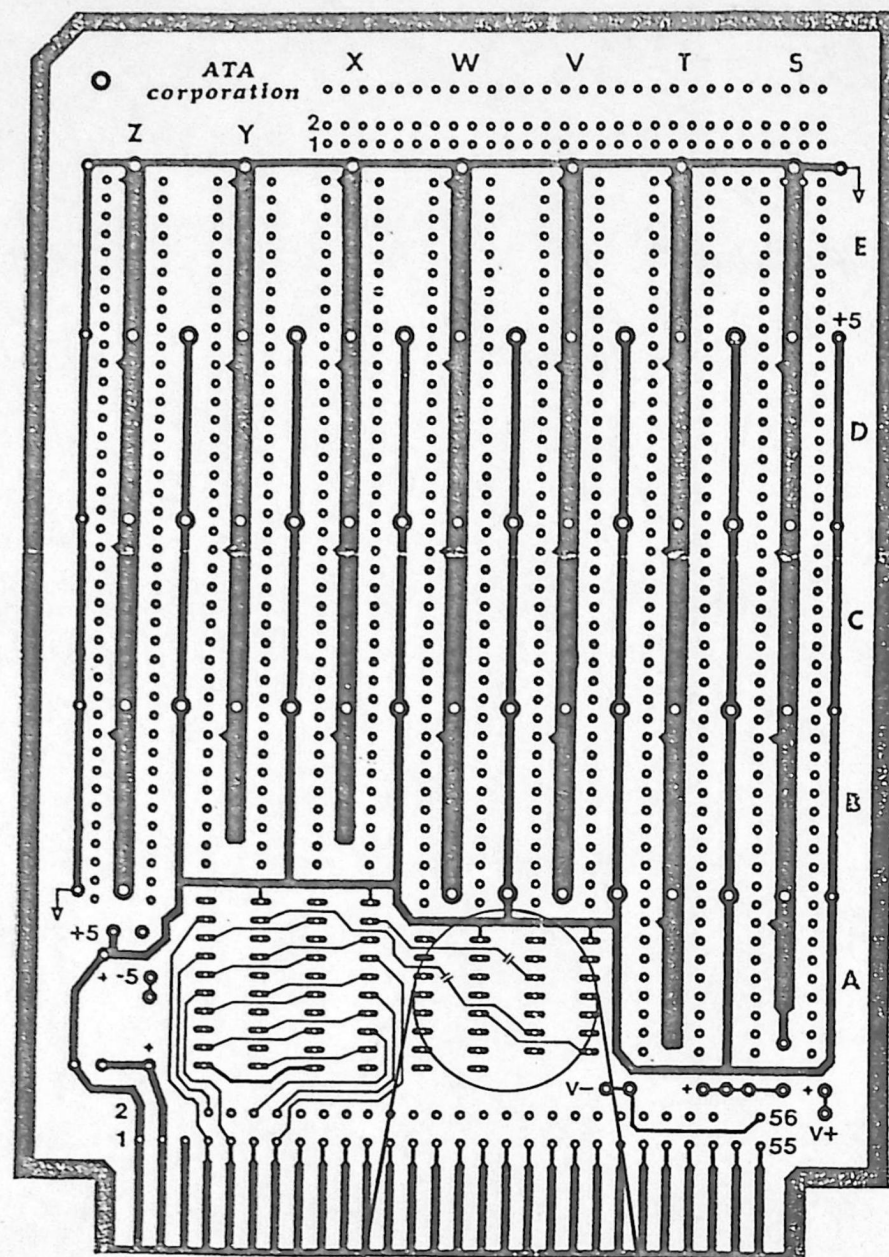


REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

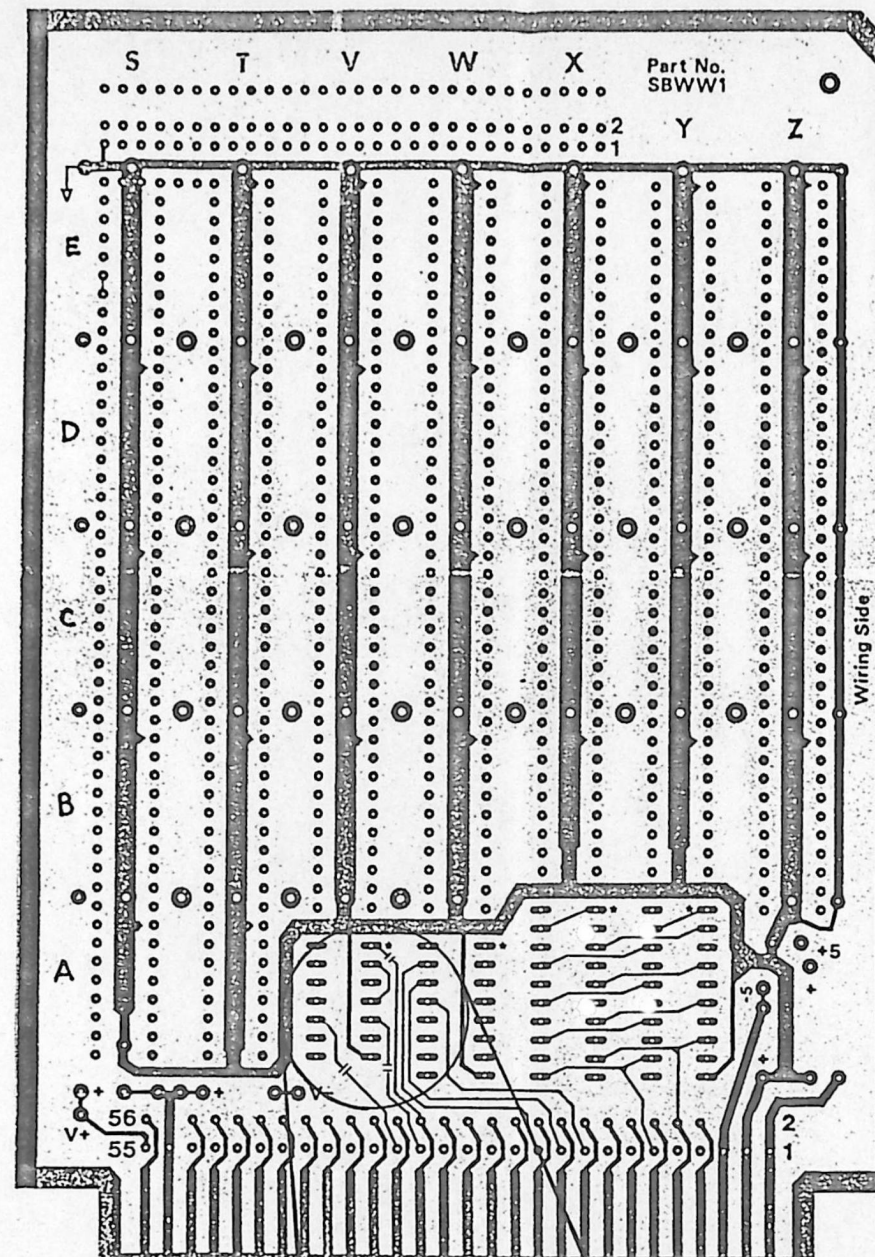
TOLERANCES UNLESS OTHERWISE SPECIFIED		FRACTIONS DEC ANGLES	
±	±	±	±

APPROVALS	DATE
DRAWN DW	9/15/81
CHECKED REV A	

ATA Corp.	
COMPUTER IMAGE	
RPU EXERCISER	
ADDRESS DECODING & BUS DRIVERS	
SIZE	DRAWING NO.
CIC-W-68 B	
DO NOT SCALE DRAWING	SHEET 5 of 5



COMPONENT SIDE



WIRING SIDE

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

MODIFICATIONS TO ATA SBWW1
For Eclipse/RPU Virtual Video RAM P/N CIC-W-69

1. Cut etch between AV-1 and Bus Pin 32 ($\overline{RD}$)
2. Cut Etch between AV-5 and Bus Pin 31 ($\overline{WR}$)
3. Cut Etch between AV-10 and Bus Pin 33 ($\overline{IORQ}$)
4. Cut etch between AV-3 and AX-19
5. Cut etch between AV-6 and AY-19

P.W.B. Modification Details

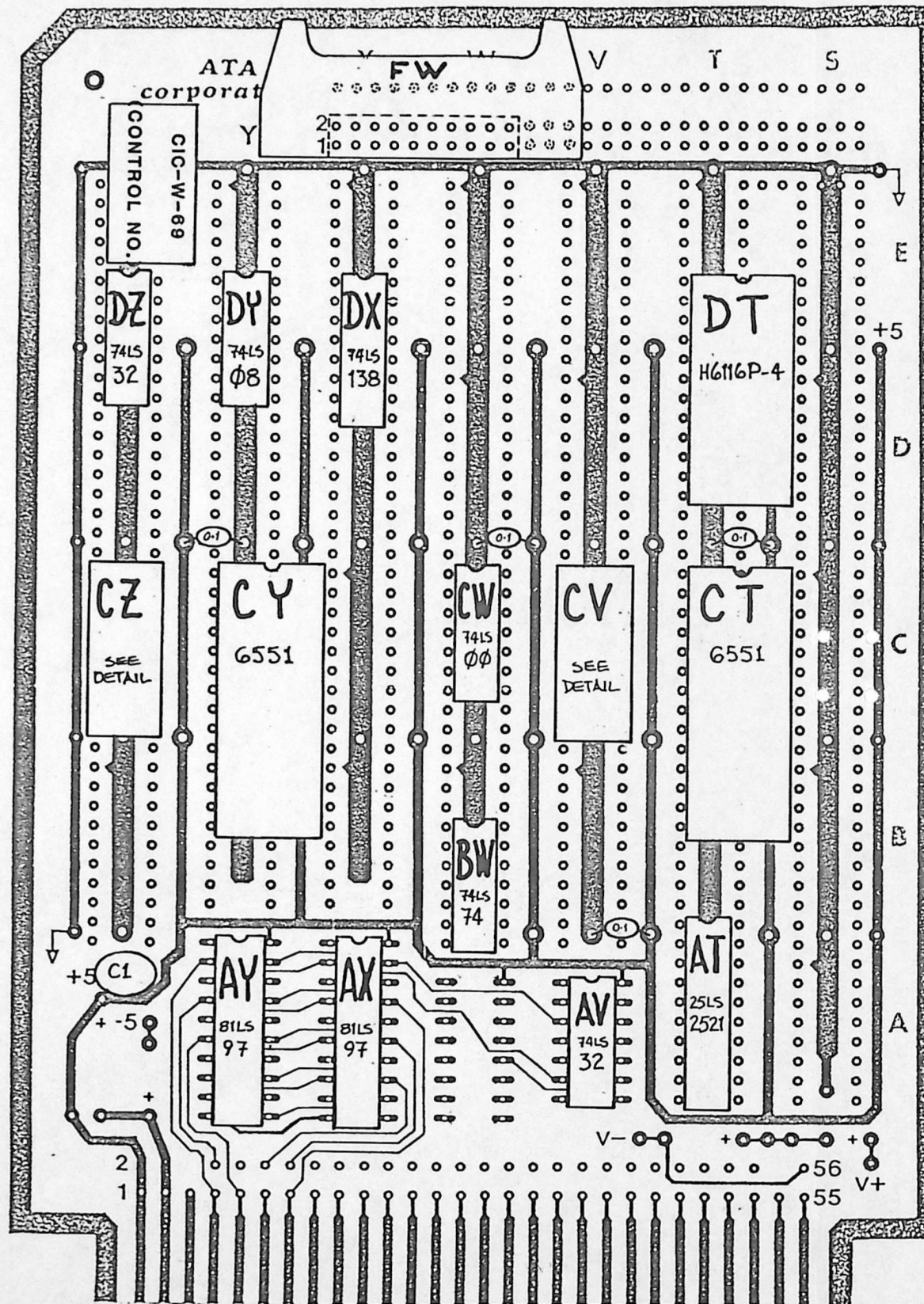
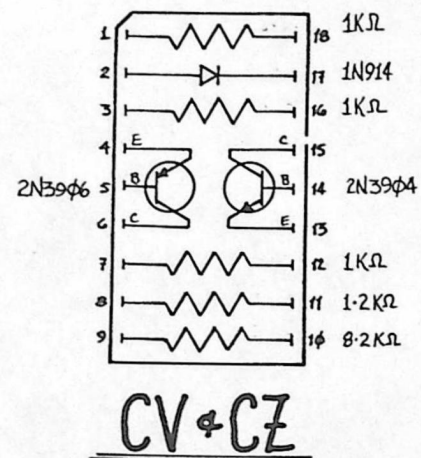
TOLERANCES UNLESS OTHERWISE SPECIFIED FRACTIONS DEC ANGLES ± ± ±		ATA Corp.	
		COMPUTER IMAGE ECLIPSE/RPU COMMUNICATION	
APPROVALS	DATE	CONTROL PANEL - SYSTEM IV	
DRAWN	SEP 4-7-82	CIC-W-69	
CHECKED		SIZE B	DRAWING NO. 11015D1
		DO NOT SCALE DRAWING	
		SHEET 2 of 5	

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

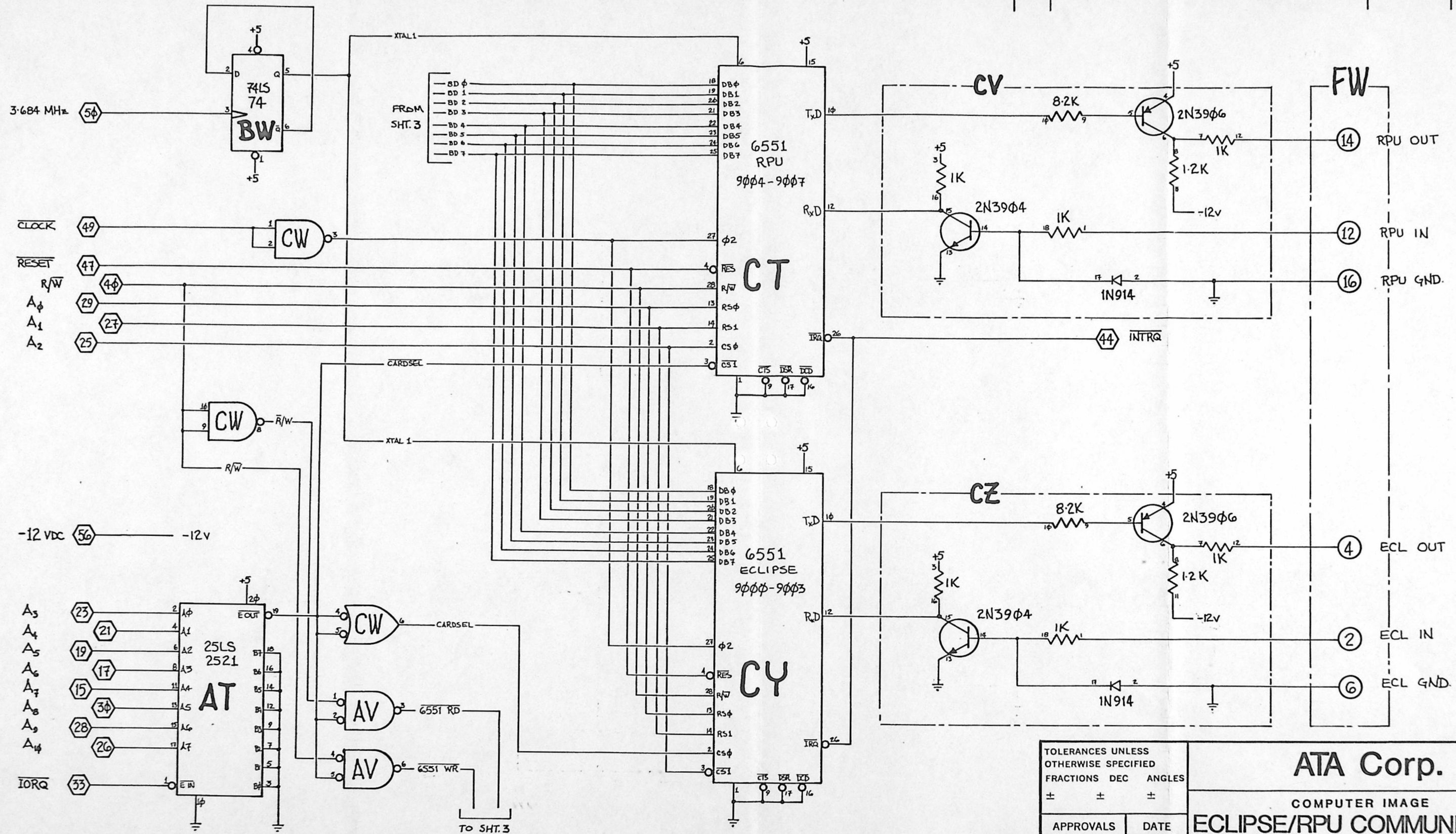
PARTS LIST

QTY	P/N	Description	Ref.
1	SBWW1	Std. Bus W.W. PCB	
1	3429-3205	20 Pin, Rt. Angle W.W. Header, 3M	FW
5		14 Pin IC Socket, W.W.	AV,BW,CW,DY,DZ
1		16 Pin IC Socket, W.W.	DX
2		18 Pin IC Socket, W.W.	CV,CZ
3		20 Pin IC Socket, W.W.	AT,AX,AY
1		24 Pin IC Socket, W.W.	DT
2		28 Pin IC Socket, W.W.	CT,CY
1		Capacitor, 1.35 Microfarad	C1
4		Capacitor, 0.1 Microfarad	
2		18 Pin Header	CV,CZ
2	2N3904	Transistor, Mot.	(13,14,15)
2	2N3906	Transistor, Mot.	(4,5,6)
2	1N914	Diode	(2-17)
6		Resistor, 1K Ohm, $\frac{1}{4}$ W	(1-18,3-16,7-12)
2		Resistor, 1.2K Ohm, $\frac{1}{4}$ W	(8-11)
2		Resistor, 8.2K Ohm, $\frac{1}{4}$ W	(9-10)
1	74LS00	Quad, 2-in NAND Gate	CW
1	74LS08	Quad, 2-in AND Gate	DY
2	74LS32	Quad, 2-in OR Gate	AV,DZ
1	74LS74	Dual D-Type Flip Flop	BW
1	74LS138	1 of 8 Decoder	DX
1	H6116P-4	RAM, 200 nsec., Hitachi	DT
2	SY6551	UART, Synertek	CT,CY
2	81LS97	Octal Buffer	AX,AY
1	25LS2521	8 Bit, Equal to Comparator, AMD	AT

TOLERANCES UNLESS OTHERWISE SPECIFIED		ATA Corp.	
FRACTIONS	DEC		
±	±	±	COMPUTER IMAGE
APPROVALS	DATE	ECLIPSE/RPU COMMUNICATION	
DRAWN S.E.P.	4-7-82	CONTROL PANEL - SYSTEM IV	
CHECKED		SIZE B	DRAWING NO. 11015D1
		DO NOT SCALE DRAWING	
		SHEET 3 of 5	



REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

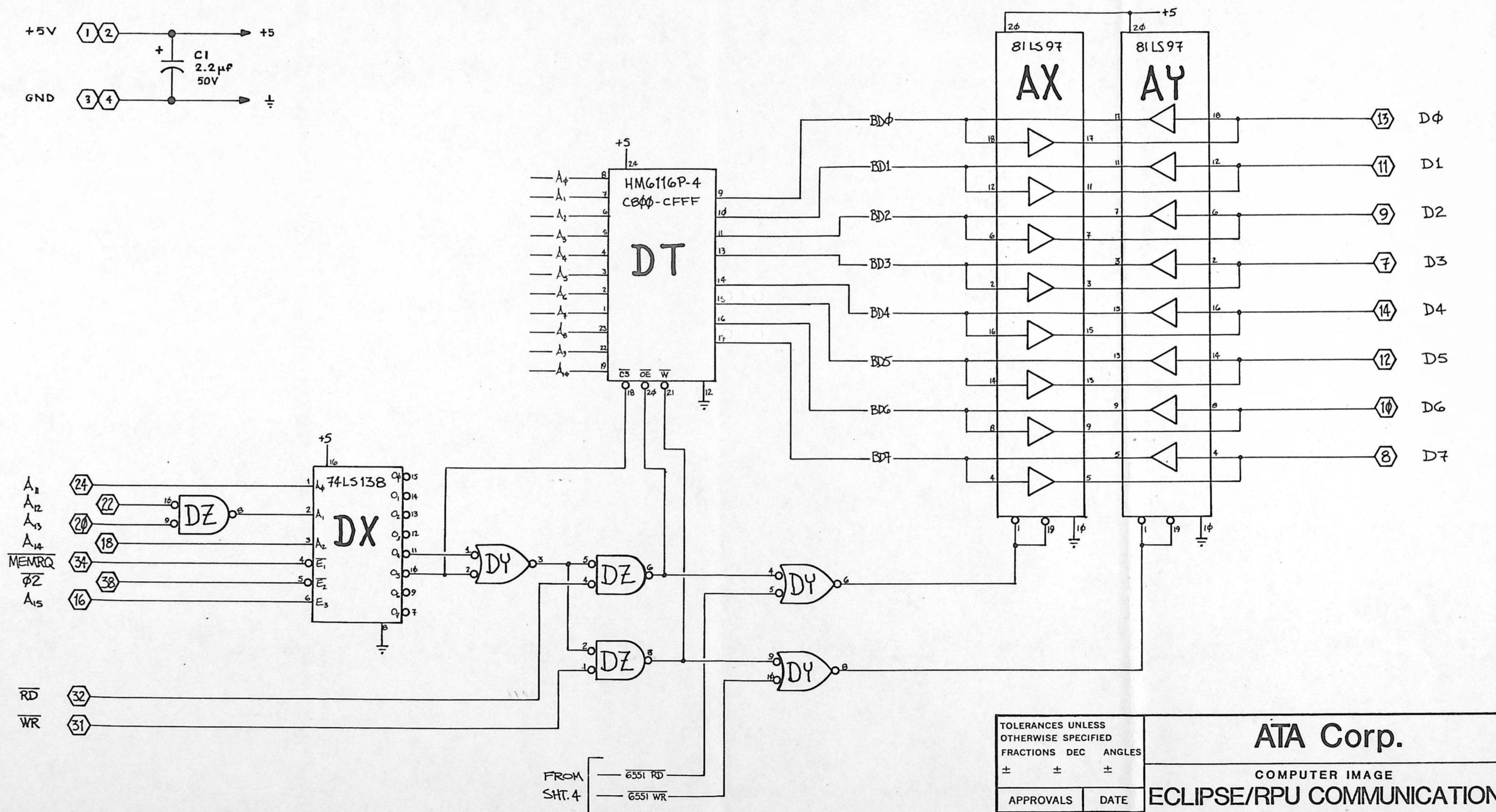


TOLERANCES UNLESS
OTHERWISE SPECIFIED
FRACTIONS DEC ANGLES
± ± ±

APPROVALS DATE
DRAWN S.E.P. 4-5-82
CHECKED

ATA Corp.			
COMPUTER IMAGE			
ECLIPSE/RPU COMMUNICATION			
CONTROL PANEL - SYSTEM IV			
CIC-W-69A	SIZE B	DRAWING NO.	11015D1
DO NOT SCALE DRAWING			SHEET 4 of 5

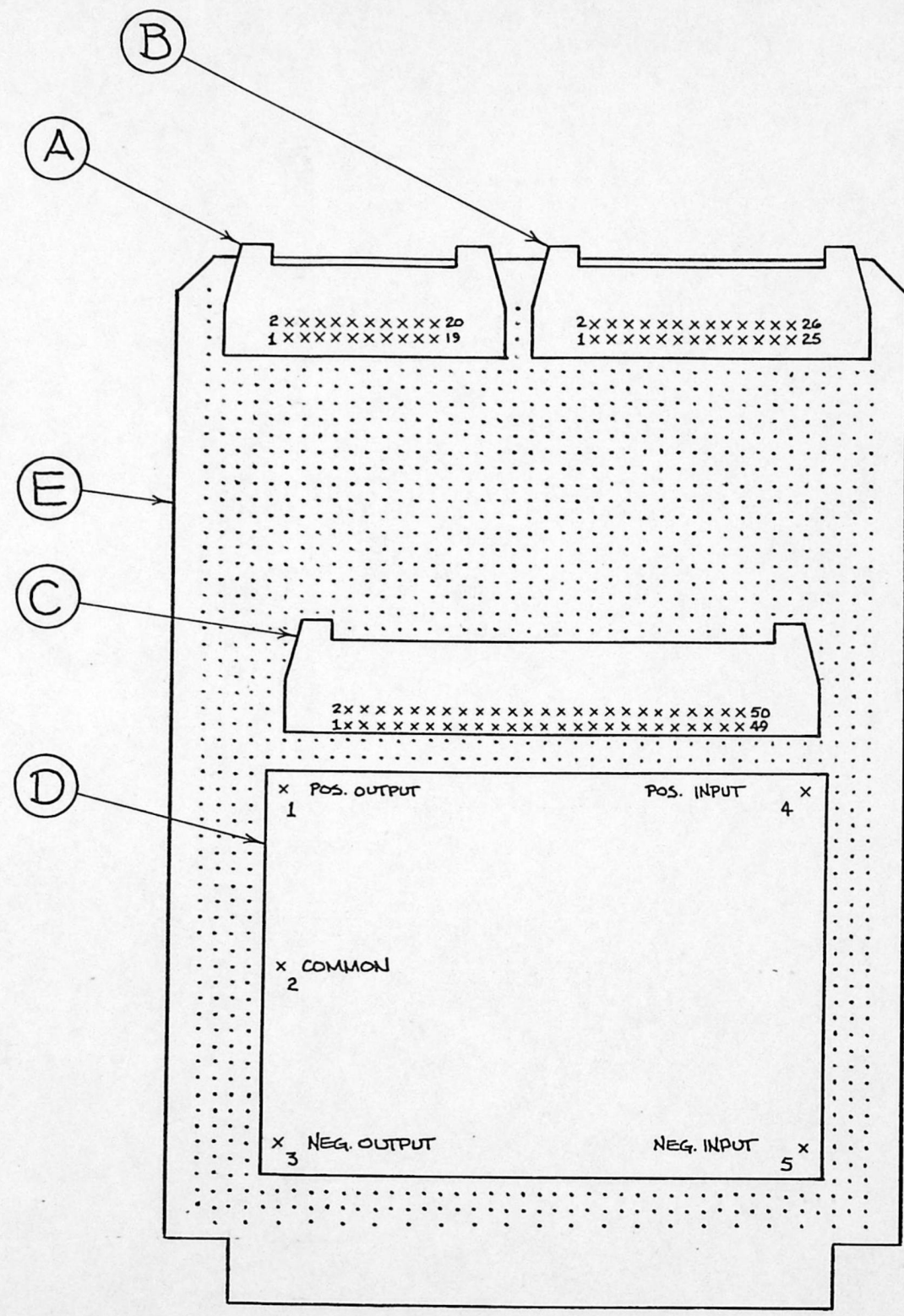
REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED



TOLERANCES UNLESS OTHERWISE SPECIFIED FRACTIONS DEC ANGLES ± ± ±			ATA Corp.	
			COMPUTER IMAGE	
APPROVALS			DATE	
DRAWN <i>S.E.P.</i>			4-6-82	
CHECKED				

[illegible]

TOLERANCES UNLESS OTHERWISE SPECIFIED		ATA Corp.	
FRACTIONS DEC ANGLES			
±	±	COMPUTER IMAGE	
APPROVALS		AUX. CONNECTION BOARD	
DATE		CONTROL SHEET	
DRAWN <i>[Signature]</i>	3/12/82	CIC-W-70B	SIZE B
CHECKED			
			10916L1
		DO NOT SCALE DRAWING	SHEET 1 of 3



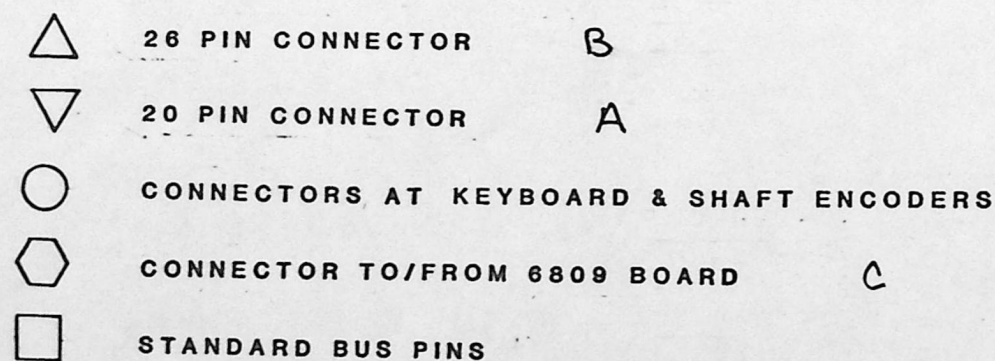
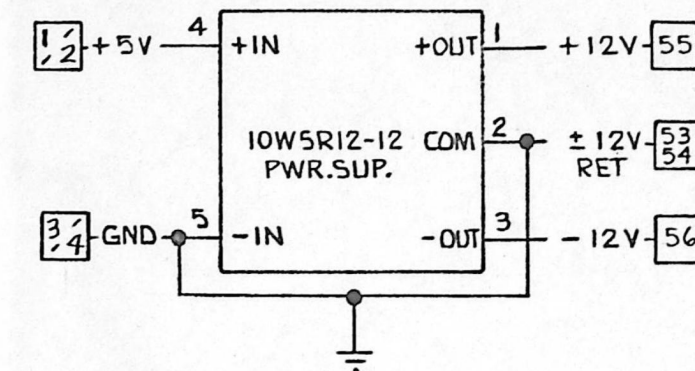
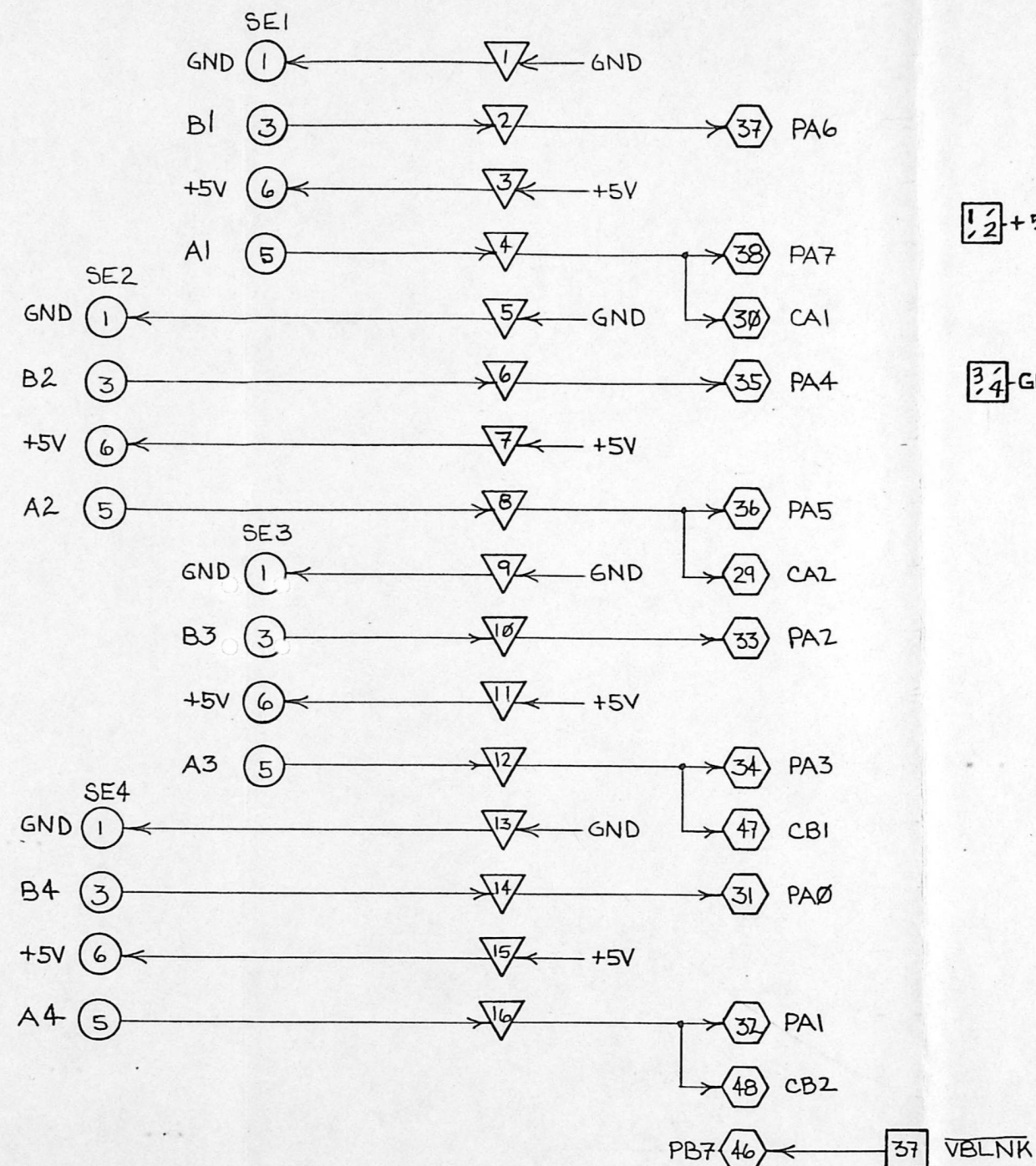
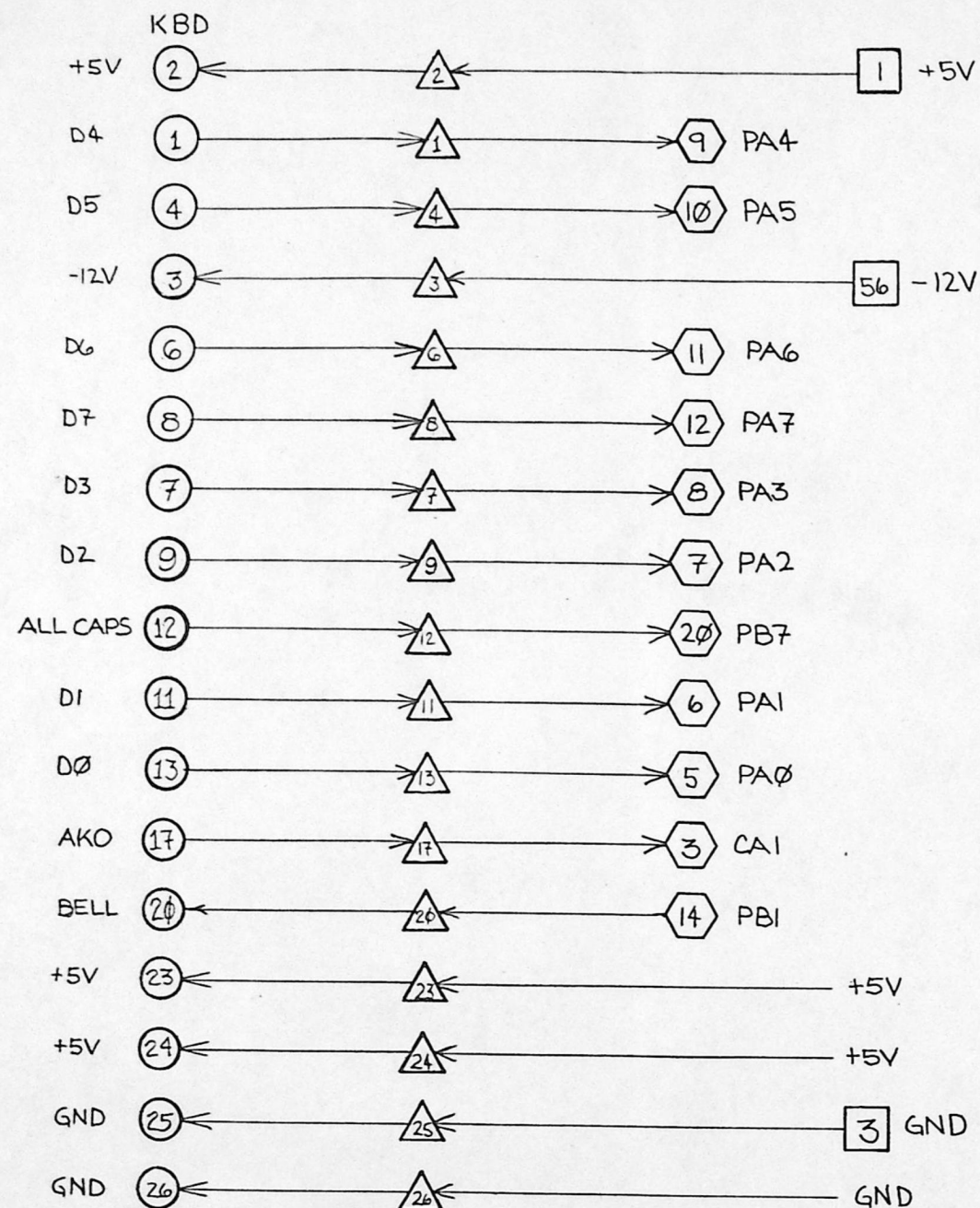
REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

PARTS LIST (REF ONLY)

QUAN	P/N	MFG.	Description	Ref.
1	3428-3205	3M	20 Pin Header	A
1	3429-3205	3M	26 Pin Header	B
1	3433-3205	3M	50 Pin Header	C
1	10W5R12-12	Reliability	5VDC to $\pm$ 12VDC Converter	D
1	4610-1	Vector	Std. Bus W.W. Board	E

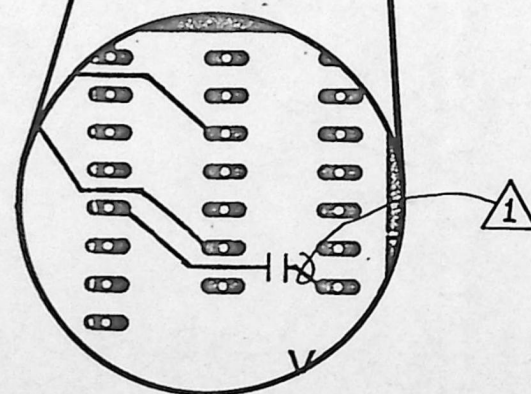
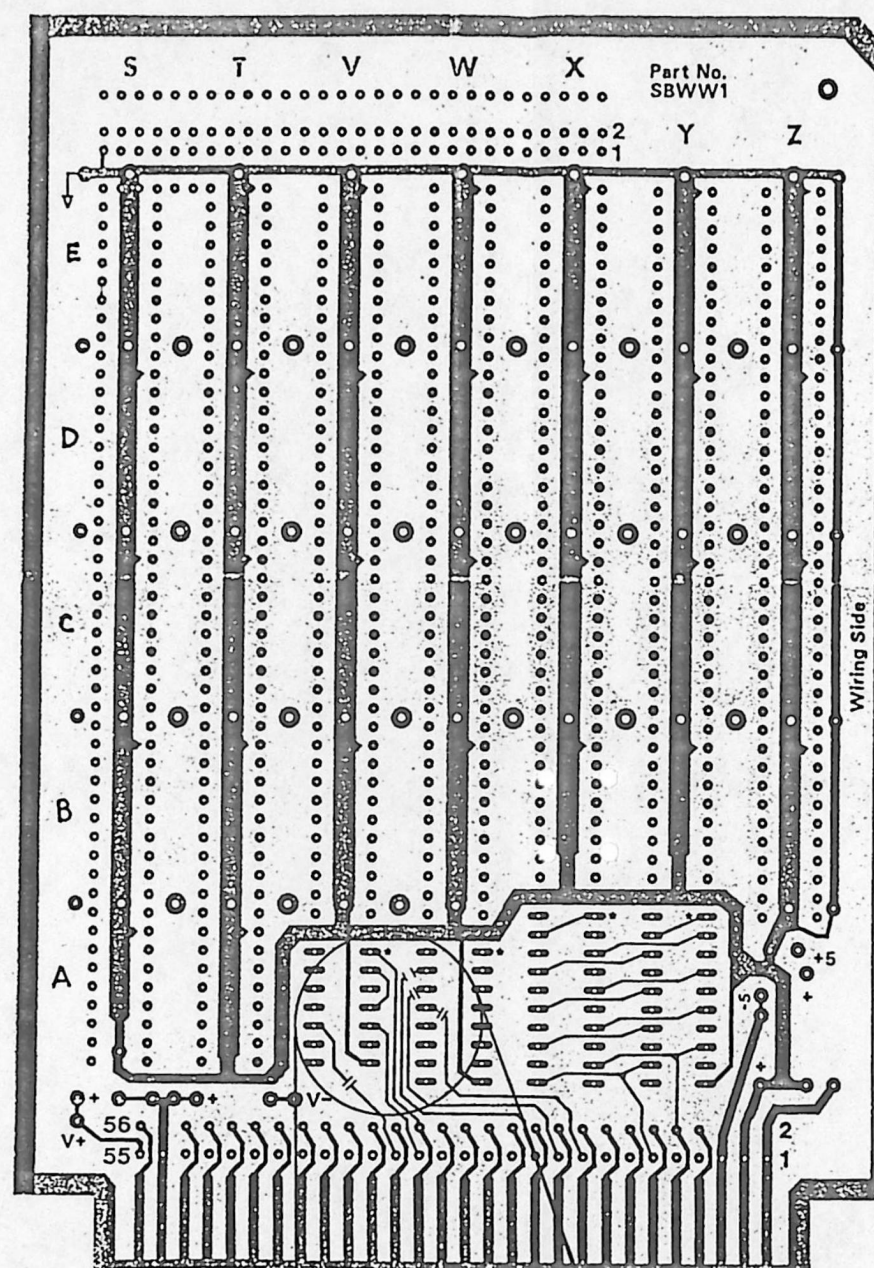
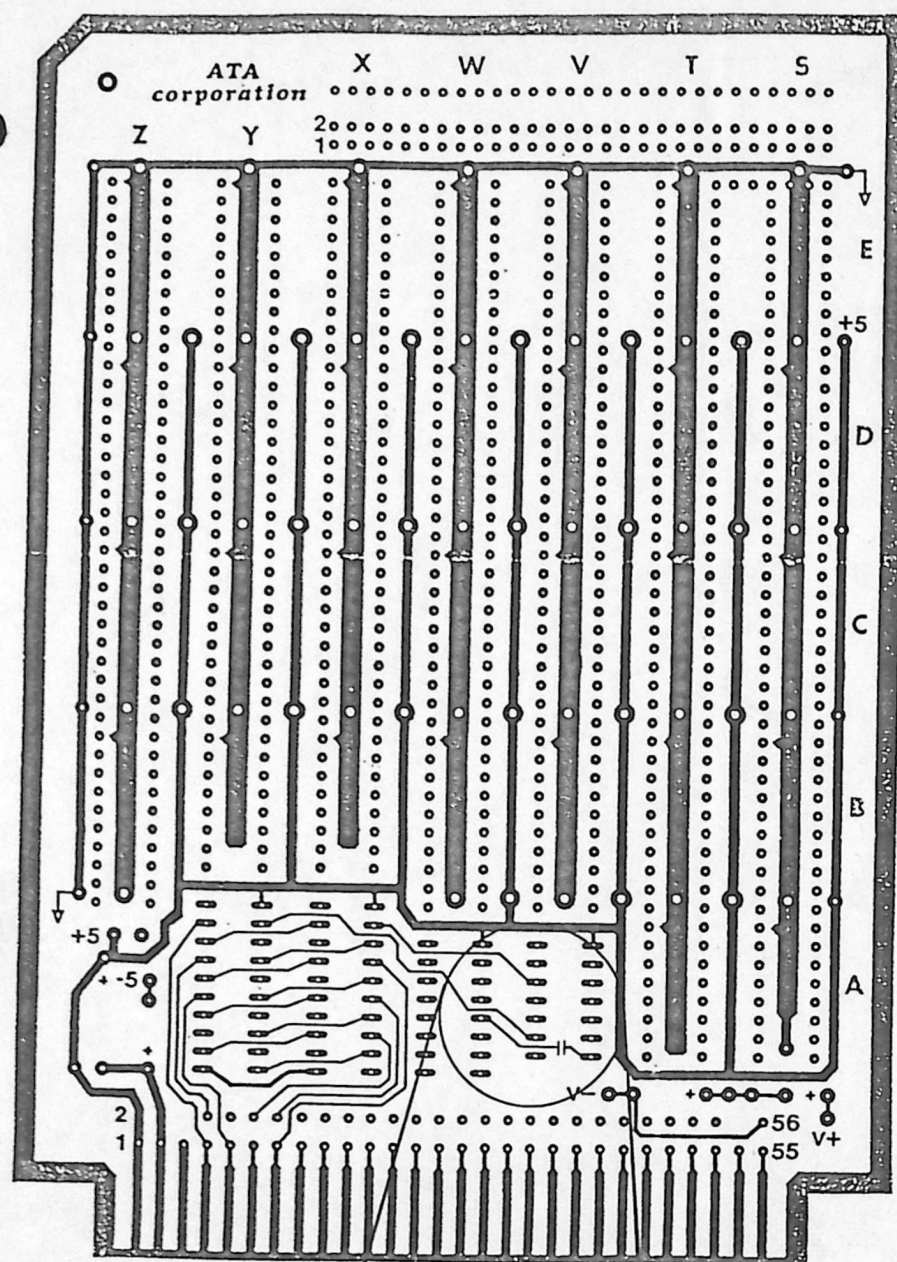
TOLERANCES UNLESS OTHERWISE SPECIFIED FRACTIONS DEC ANGLES $\pm$ $\pm$ $\pm$		ATA Corp.	
		COMPUTER IMAGE	
APPROVALS	DATE	AUX. CONNECTION BOARD	
DRAWN S.P.	4-2-82	CONTROL PANEL - SYSTEM IV	
CHECKED		CIC-W-70B	DRAWING NO. 10916L1
		SIZE B	
		DO NOT SCALE DRAWING	SHEET 2 of 3

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
B	AS PER E.C.O. NO: 0204-02L1	4-2-82	

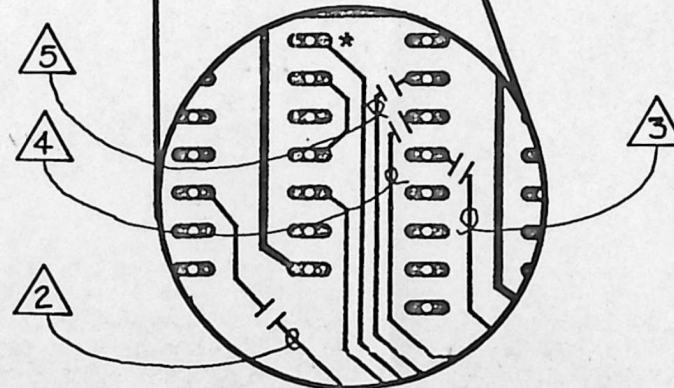


TOLERANCES UNLESS OTHERWISE SPECIFIED		
FRACTIONS	DEC	ANGLES
±	±	±
APPROVALS	DATE	
DRAWN LPD	9/16/81	
CHECKED		

ATA Corp.		
COMPUTER IMAGE		
AUX. CONNECTION BOARD		
CONTROL PANEL - SYSTEM IV		
CIC-W-70B	SIZE B	DRAWING NO. 10916L1
DO NOT SCALE DRAWING		SHEET 3 of 3



COMPONENT SIDE



WIRING SIDE

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

Modifications to ATA SBWW1

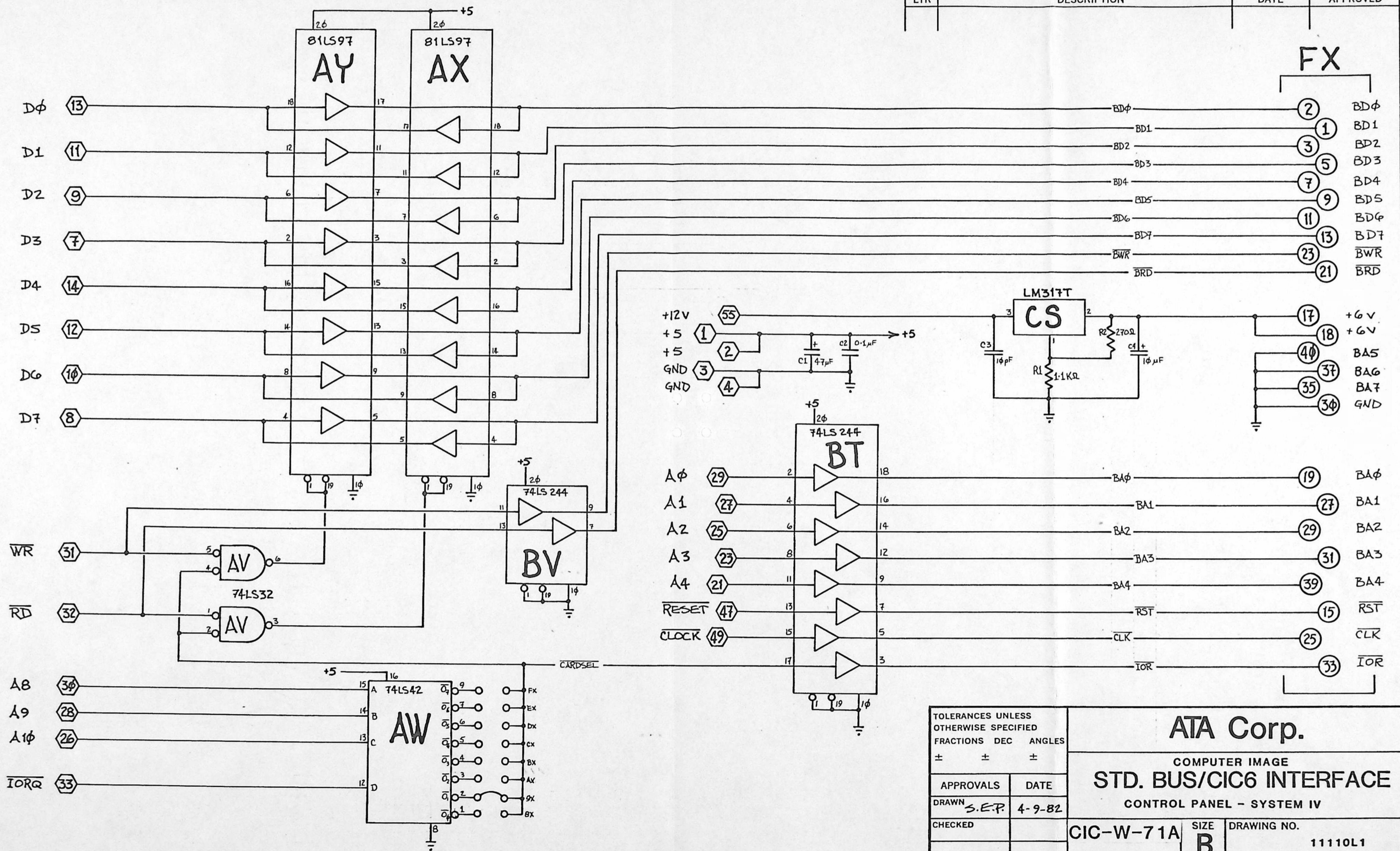
For STD Bus/CIC6 Interface P/N CIC-W-71

1. Cut Etch Between AV-8 and AW-12.
2. Cut Etch Between AV-10 and Bus Pin 33 ($\overline{\text{IORQ}}$).
3. Cut Etch Between AW-13 and Bus Pin 17 (A6).
4. Cut Etch Between AW-14 and Bus Pin 19 (A5).
5. Cut Etch Between AW-15 and Bus Pin 21 (A7).

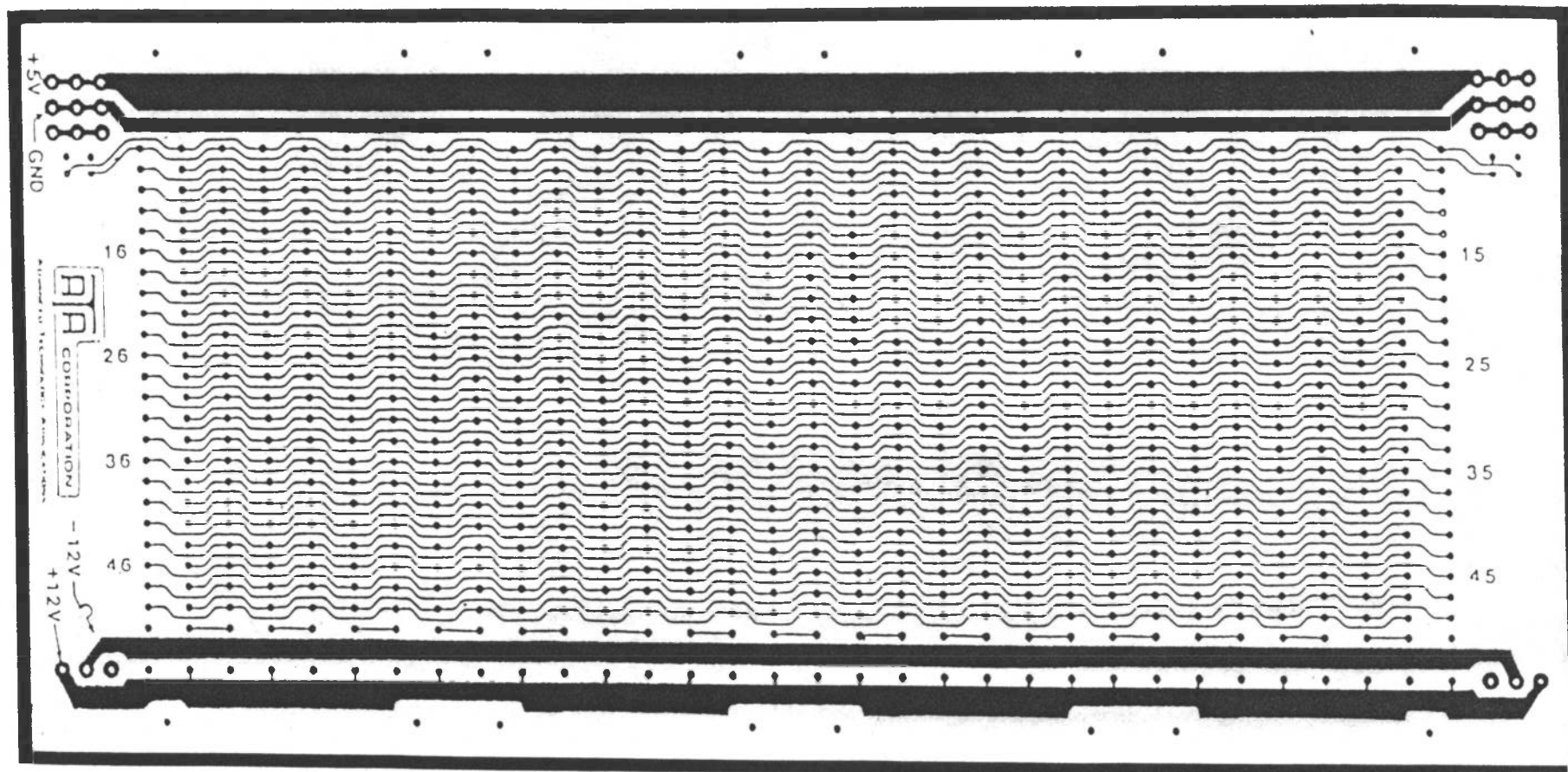
P.W.B. Modification Details

TOLERANCES UNLESS OTHERWISE SPECIFIED FRACTIONS DEC ANGLES ± ± ±			ATA Corp.		
APPROVALS DATE DRAWN CHECKED 			COMPUTER IMAGE STD. BUS/CIC6 INTERFACE CONTROL PANEL - SYSTEM IV		
			CIC-W-7 1A	SIZE B	DRAWING NO. 11110L1
			DO NOT SCALE DRAWING		SHEET 2 of 4

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED



TOLERANCES UNLESS OTHERWISE SPECIFIED FRACTIONS DEC ANGLES ± ± ±			
ATA Corp.			
COMPUTER IMAGE STD. BUS/CIC6 INTERFACE CONTROL PANEL - SYSTEM IV			
APPROVALS	DATE	CIC-W-71A	
DRAWN S.E.P.	4-9-82	SIZE B	DRAWING NO. 11110L1
CHECKED		DO NOT SCALE DRAWING	
		SHEET 4 of 4	



CONTROL PANEL ELECTRONICS
STANDARD BUS BACKPLANE

CIC-72

COMPONENT SIDE					CIRCUIT SIDE			
	PIN	MNEMONIC	SIGNAL FLOW	DESCRIPTION	PIN	MNEMONIC	SIGNAL FLOW	DESCRIPTION
Logic Power Bus	1	+ 5V	In	+5 volts DC (Bussed)	2	+ 5V	In	+5 Volts DC (Bussed)
	3	GND	In	Digital Ground (Bussed)	4	GND	In	Digital Ground (Bussed)
	5	- 5V	In	-5 Volts DC	6	- 5V	In	-5 Volts DC
Data Bus	7	D3	In/Out	Low Order Data Bus	8	D7	In/Out	High Order Data Bus
	9	D2	In/Out	Low Order Data Bus	10	D6	In/Out	High Order Data Bus
	11	D1	In/Out	Low Order Data Bus	12	D5	In/Out	High Order Data Bus
	13	D0	In/Out	Low Order Data Bus	14	D4	In/Out	High Order Data Bus
Address Bus	15	A7	Out	Low Order Address Bus	16	A15	Out	High Order Address Bus
	17	A6	Out	Low Order Address Bus	18	A14	Out	High Order Address Bus
	19	A5	Out	Low Order Address Bus	20	A13	Out	High Order Address Bus
	21	A4	Out	Low Order Address Bus	22	A12	Out	High Order Address Bus
	23	A3	Out	Low Order Address Bus	24	A11	Out	High Order Address Bus
	25	A2	Out	Low Order Address Bus	26	A10	Out	High Order Address Bus
	27	A1	Out	Low Order Address Bus	28	A9	Out	High Order Address Bus
	29	A0	Out	Low Order Address Bus	30	A8	Out	High Order Address Bus
Control Bus	31	WR	Out	Write to Memory or I/O	32	RD	Out	Read to Memory or I/O
	33	IORO	Out	I/O Address Select	34	MEMRO	Out	Memory Address Select
	35	IOEXP	In/Out	I/O Expansion	36	MEMEX	In/Out	Memory Expansion
	37	REFRESH	Out	Refresh Timing	38	MCSYNC	Out	CPU Machine Cycle Sync
	39	STATUS 1	Out	CPU Status	40	STATUS 0	Out	CPU Status
	41	BUSAK	Out	Bus Acknowledge	42	BUSRO	In	Bus Request
	43	INTAK	Out	Interrupt Acknowledge	44	INTRO	In	Interrupt Request
	45	WAITRO	In	Wait Request	46	NMIRO	In	Non-Maskable Interrupt
	47	SYSRESET	Out	System Reset	48	PBRESET	In	Push Button Reset
	49	CLOCK	Out	Clock from Processor	50	CNTRL	In	AUX Timing
	51	PCO	Out	Priority Chain Out	52	PCI	In	Priority Chain In
Power Bus	53	AUXGND	In	AUX Ground (Bussed)	54	AUXGND	In	AUX Ground (Bussed)
	55	AUX V	In	AUX Positive 1-12 Volts DC1	56	AUX-V	In	AUX Negative 1-12 Volts DC1

←	→
↓	↑
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[	]
⋮	CEM

ESC	!	@	#	\$	%	&	^	*	(	)	-	=	DEL	
	1	2	3	4	5	6	7	8	9	0	-	+		
TAB	Q	W	E	R	T	Y	U	I	O	P	LINE FEED			
CAPS LOCK	A	S	D	F	G	H	J	K	L	:	"		RETURN	
SHIFT	Z	X	C	V	B	N	M	<	>	?	/		SHIFT	
EXT	CONTROL												CONTROL	

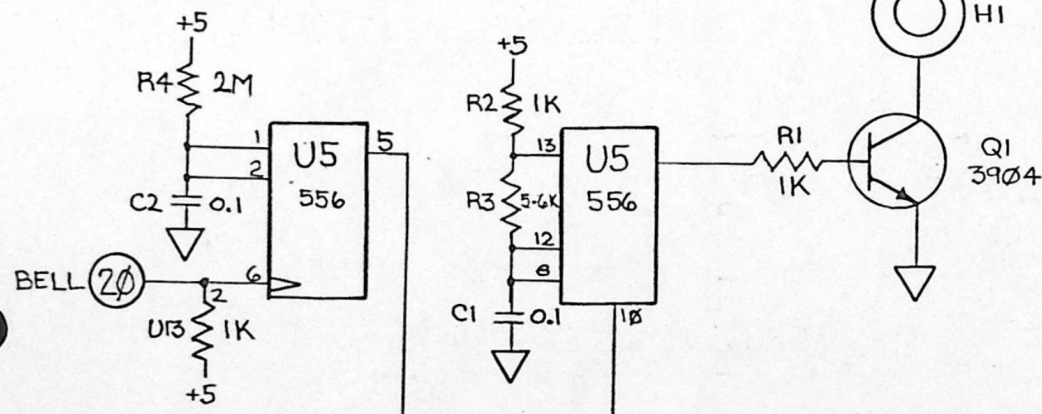
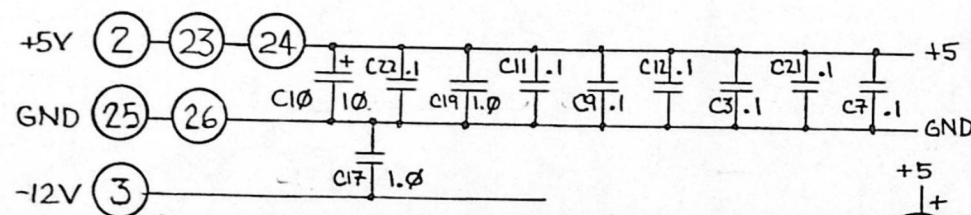
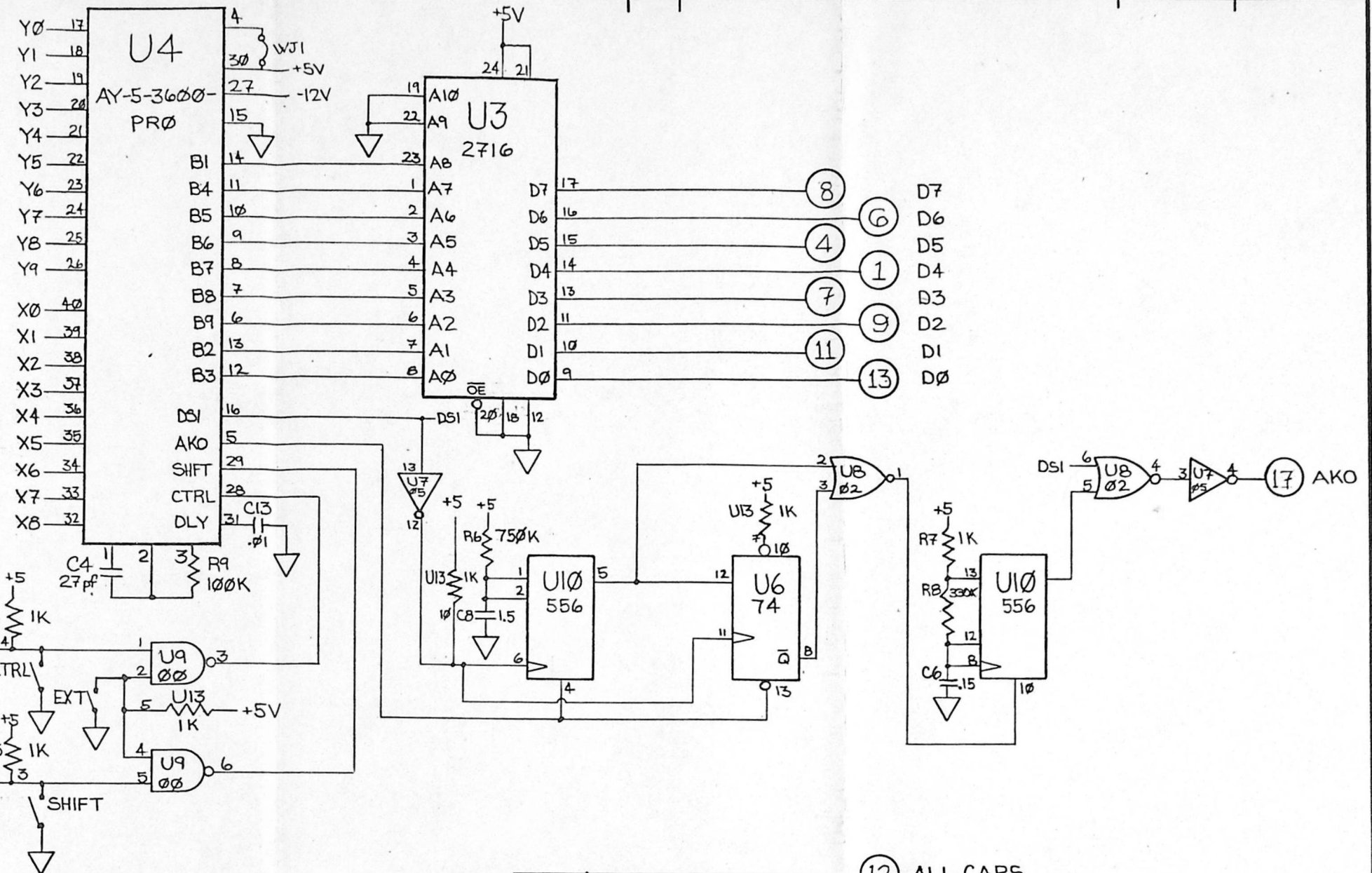
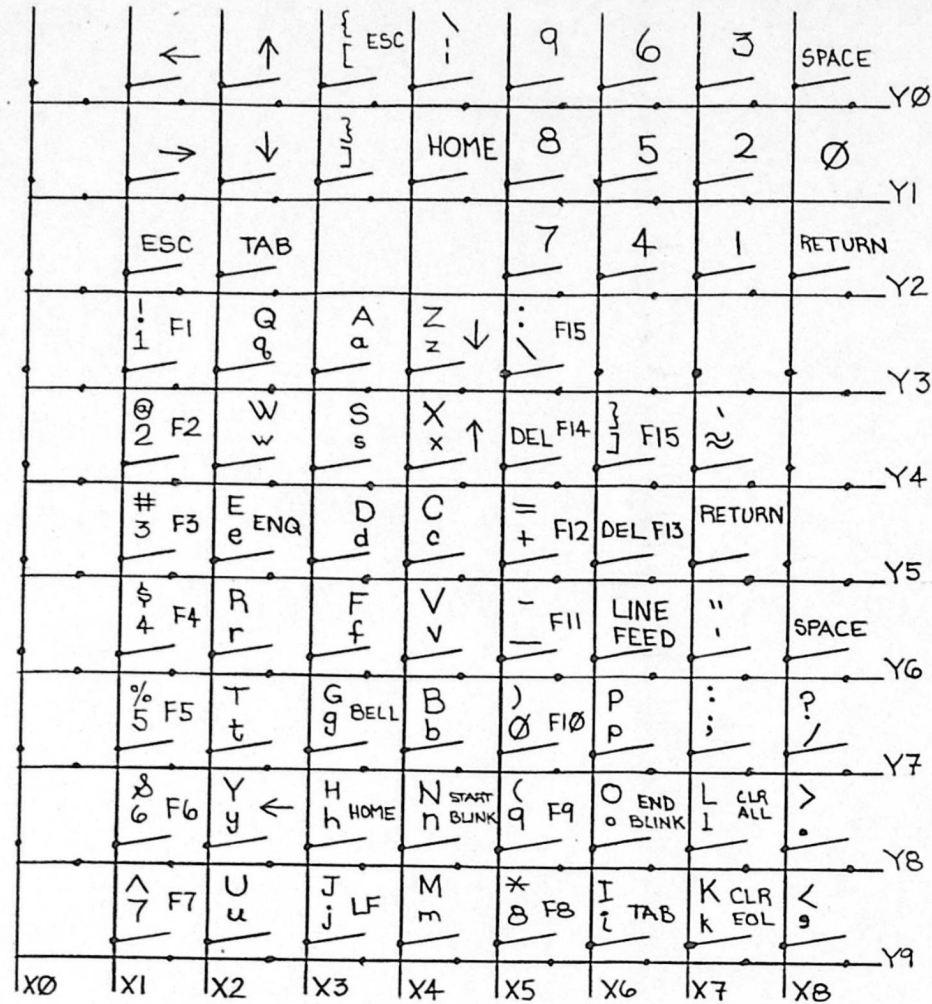
7	8	9
4	5	6
1	2	3
RET	Ø	

				COMPUTER IMAGE CORP. DENVER, CO.			
SCALE	NONE			REVISIONS	BY	DATE	
DATE	1-12-81						
DRN	GSH			CRD			
APVD							
TITLE	SYSTEM IV KEYBOARD					NO	CIC-W-73

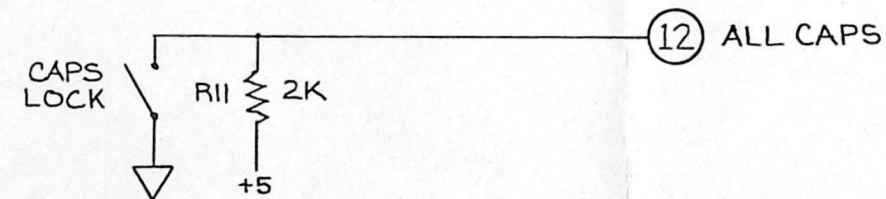
KEYBOARD PCB SCI-PRO SP-100

REVISIONS

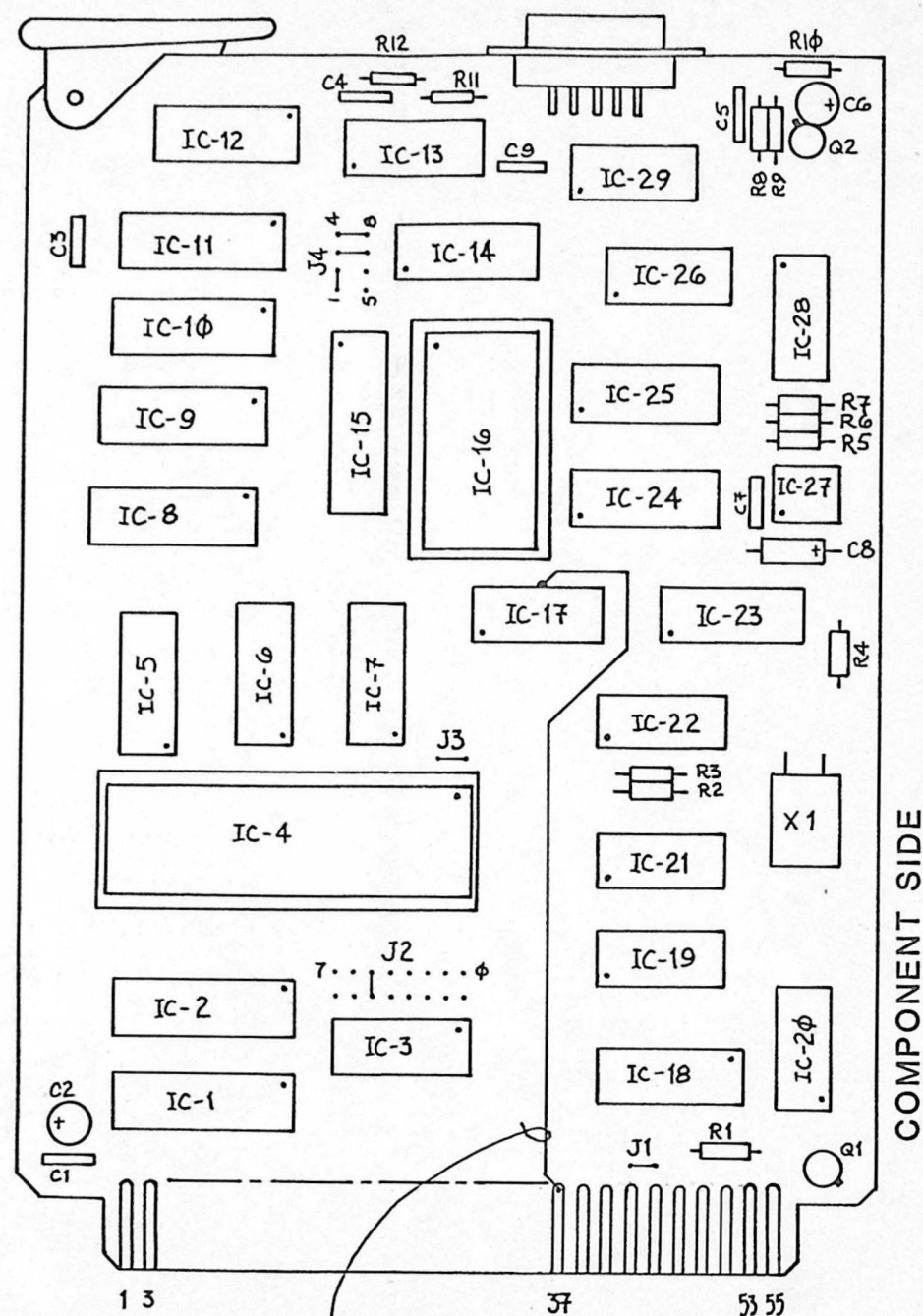
LTR	DESCRIPTION	DATE	APPROVED
A	AS PER E.C.O NO: 0204-0211	4-2-82	



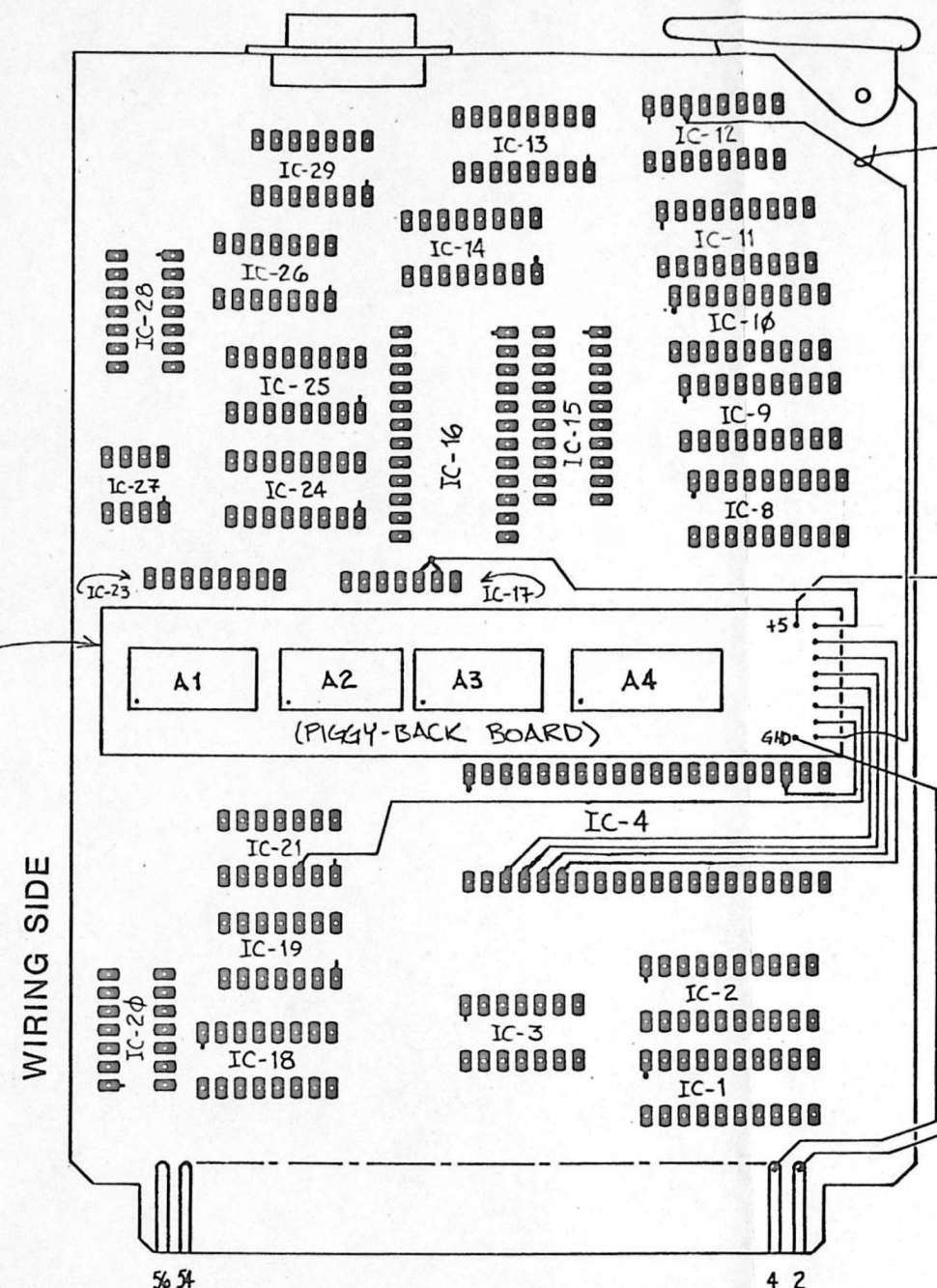
NOTE: ALL CAPACITOR VALUES IN MICROFARADS UNLESS OTHERWISE NOTED



TOLERANCES UNLESS OTHERWISE SPECIFIED		FRACTIONS DEC ANGLES		± ± ±	
APPROVALS		DATE		ATA Corp.	
DRAWN LPD		9/10/81		COMPUTER IMAGE	
CHECKED				TERMINAL KEYBOARD	
				CONTROL PANEL - SYSTEM IV	
				CIC-W-73	DRAWING NO. 10918L1
				DO NOT SCALE DRAWING	SHEET 2 of 2



FOR DETAILS,
SEE SHEET 3.



REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

TOLERANCES UNLESS OTHERWISE SPECIFIED			
FRACTIONS	DEC	ANGLES	
±	±	±	
APPROVALS	DATE		
DRAWN S.E.P.	4-21-82		
CHECKED			

ATA Corp.
COMPUTER IMAGE
CRT CONTROLLER
CONTROL PANEL-SYSTEM IV

CIC-W-74A
SIZE B

DRAWING NO.
97098-401

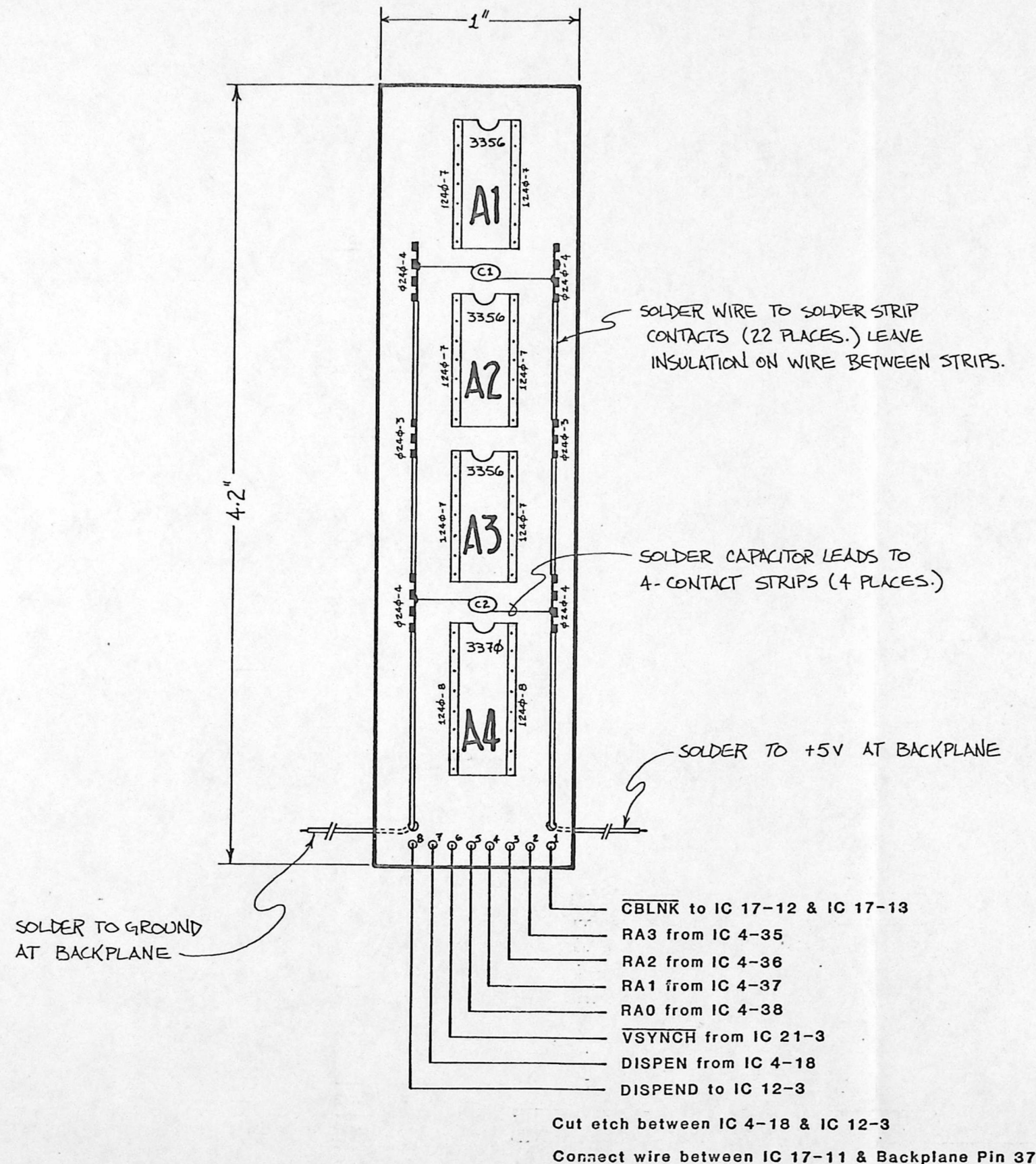
DO NOT SCALE DRAWING

SHEET 2 of 5

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

PARTS LIST (REF ONLY)

QTY	P/N	Description	Ref.
1	8005	Vector Board (Cut to 1" x 4.2")	
2		0.1 Microfarad Capacitor	C1,C2
3	3356-1000	14 Pin IC Socket, 3M	
1	3370-1000	16 Pin IC Socket, 3M	
3	3397-1240	24 Contact Plug Strip, 3M (Cut 6 x 7 Contact Strips) (Cut 2 x 8 Contact Strips)	1240-7 1240-8
1	3397-0240	24 Contact Solder Strip, 3M (Cut 4 x 4 Contact Strips) (Cut 2 x 3 Contact Strips)	0240-4 0240-3
2'		26 AWG, Insulated W.W. Wire	
1	74LS04	Hex Inverter	A1
1	74LS08	Quad, 2-in AND Gate	A2
1	74LS74	Dual D-Type Flip-Flop	A3
1	74LS85	4-Bit Comparator	A4



NOTE: Attach this assembly to back (wiring side) of CRT Controller PCB with double-sided foam tape

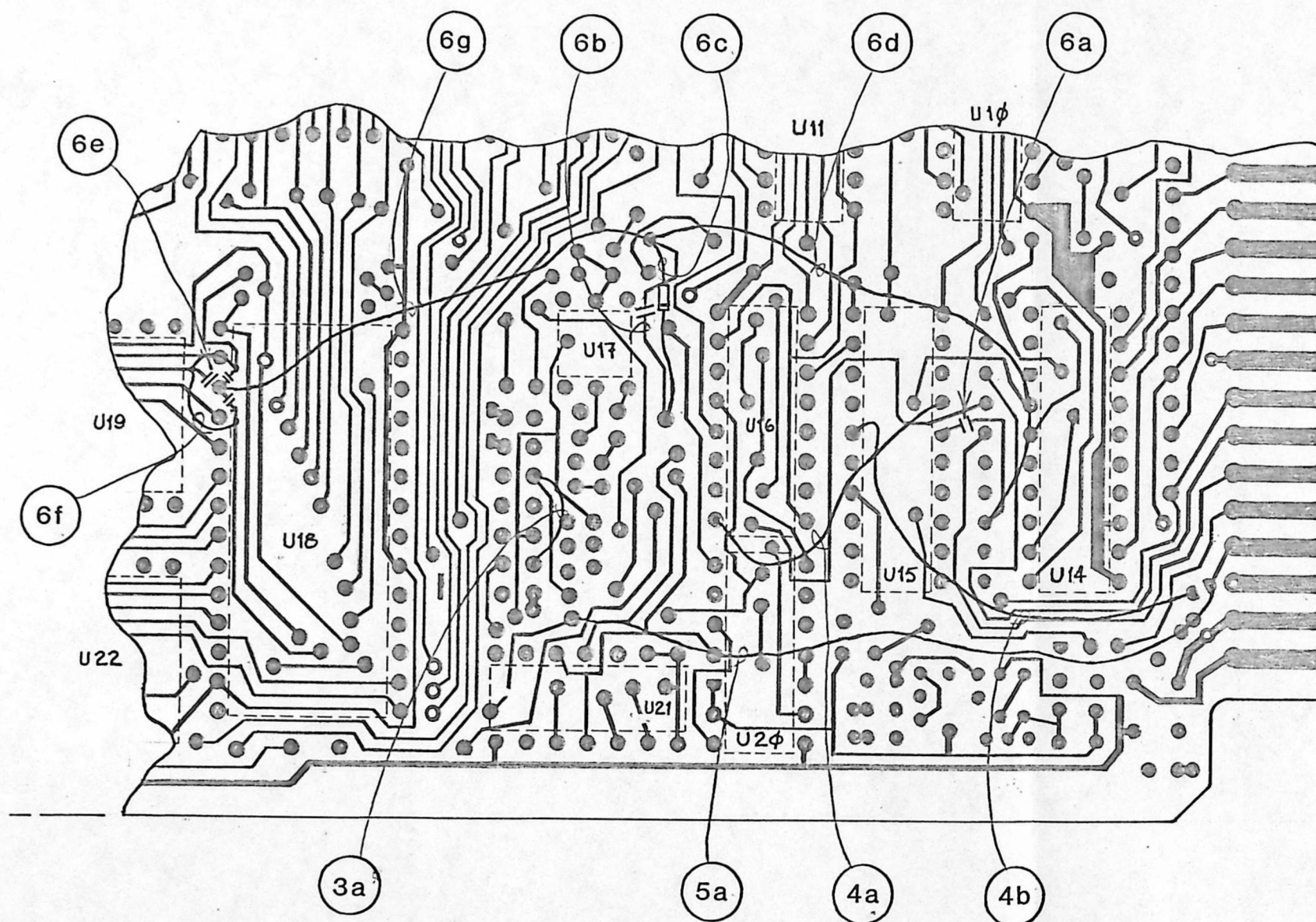
TOLERANCES UNLESS OTHERWISE SPECIFIED FRACTIONS DEC ANGLES ± ± ±		ATA Corp.	
		COMPUTER IMAGE	
APPROVALS	DATE	CRT CONTROLLER MODIFICATIONS	
DRAWN SEP	4-12-82	CONTROL PANEL - SYSTEM IV	
CHECKED		CIC-W-74A	DRAWING NO. 97098-401
		SIZE B	
		DO NOT SCALE DRAWING	SHEET 3 of 5

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

6809 CHANGES

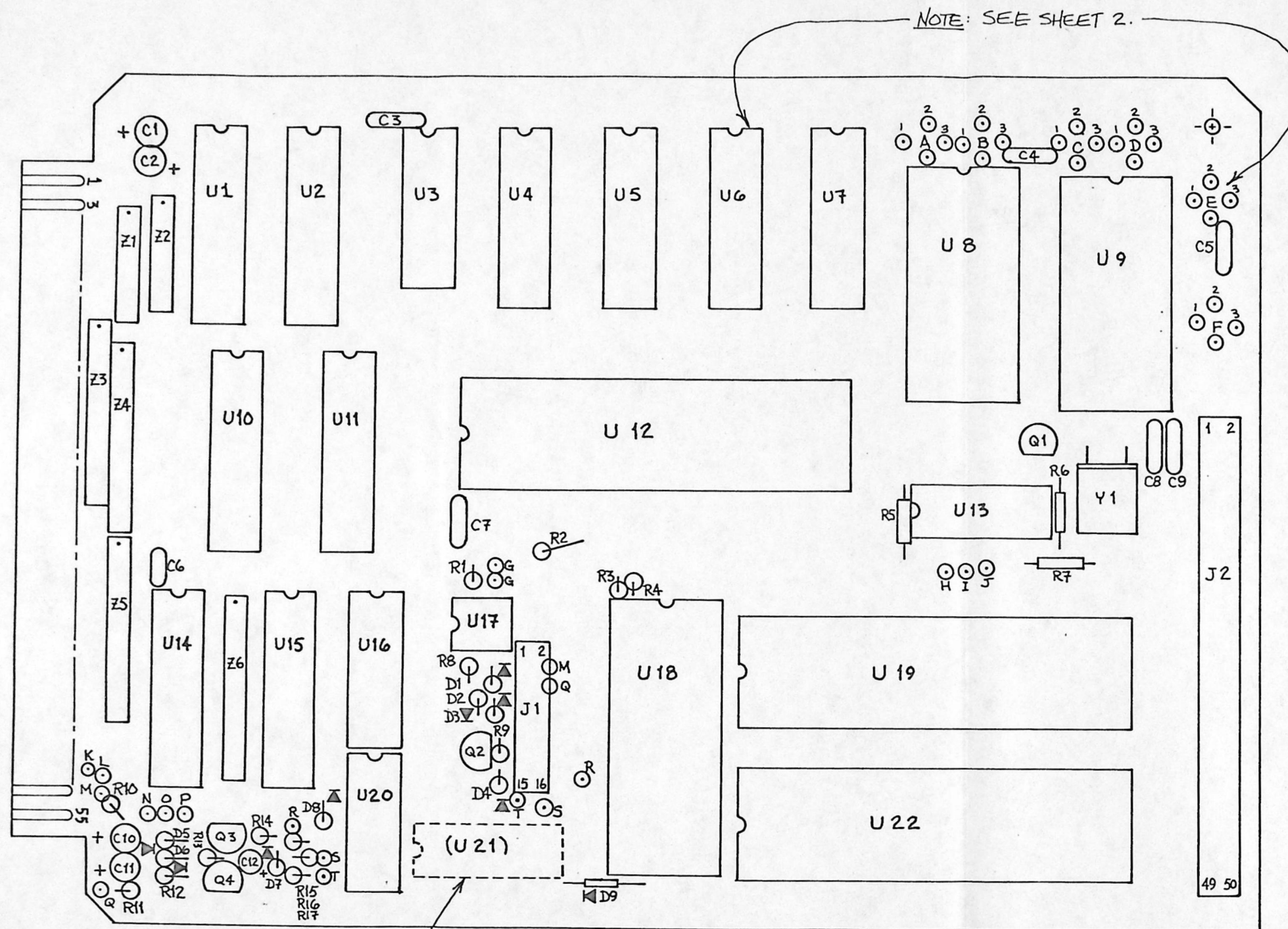
BLUE WIRE

- STRAP FOR 2732's
 - Locate jumper E
 - Cut etch from E to 2
 - Add jumper from E to 1
- INSTALL UPPER RAM
 - Insert 2114 type IC's into sockets at U5 and U6 locations
- GROUND $\overline{DSR}$ ON 6551 TO PREVENT SPURIOUS INTERRUPTS
 - Connect U18-17 and U18-16 at Berg connector J1
- PROVIDE CLOCK SIGNAL ON STD. BUS PIN 49
 - Add wire between U15-4 and U16-9
 - Add wire between U15-16 and Std Pin 49
- PROVIDE 3.684 MHZ CLOCK ON STD. BUS PIN 50
 - Add wire between U13-3 and Std Pin 50
- PROVIDE $\overline{NMI}$ FROM 6551 TO 6809 FOR DEBUGGER
 - Cut etch between U15-5 and Z6-8
 - Cut etch between U15-5 and U12-2
 - Add 1N4148 Diode (Note Polarity!) between U15-5 and U12-2
 - Add wire between Z6-8 and U12-2
 - Cut three etches at U18-26 ($\overline{IRQ}$) to isolate Pin 26
 - Reconnect two etches cut in previous step with wire jumper. Leave Pin 26 isolated!
 - Add wire between U18-26 and U12-2
- PROVIDE FRTQ SIGNAL ON STD. BUS PIN 39.
 - CUT ETCH BETWEEN BUS PIN 39 & U14-14. CUT CLOSE TO EDGE CONNECT.
 - CONNECT WIRE BETWEEN U12-4 & BUS PIN 39.

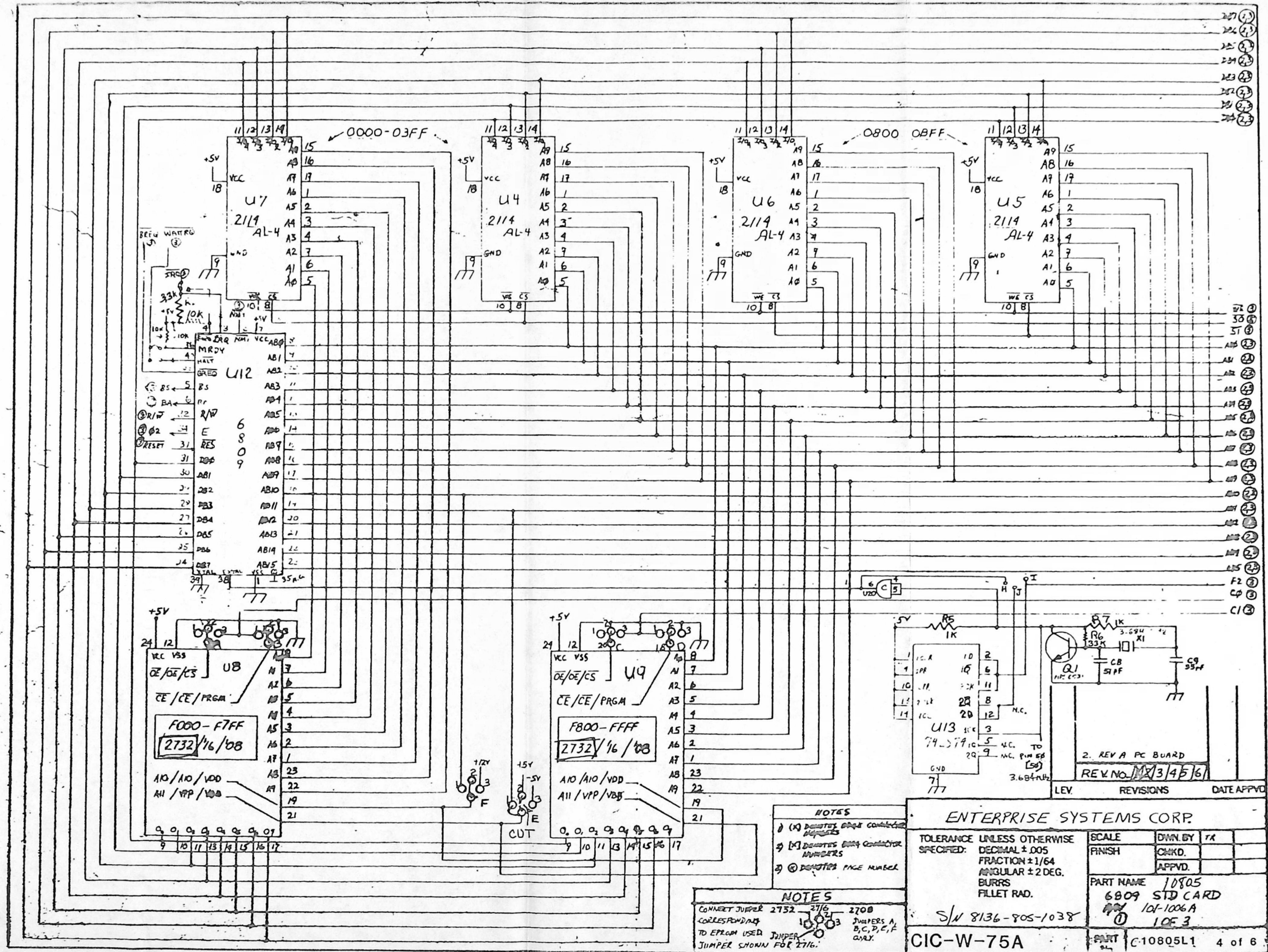


TOLERANCES UNLESS OTHERWISE SPECIFIED			ATA Corp.	
FRACTIONS	DEC	ANGLES		
±	±	±	COMPUTER IMAGE	
APPROVALS			6809 MPU	
DRAWN S.E.P. 4-82			CONTROL PANEL-SYSTEM IV	
CHECKED G.H. 10-82			CIC-W-75A	DRAWING NO. 10805L1
			SIZE B	
			DO NOT SCALE DRAWING	
			SHEET 2 of 6	

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED



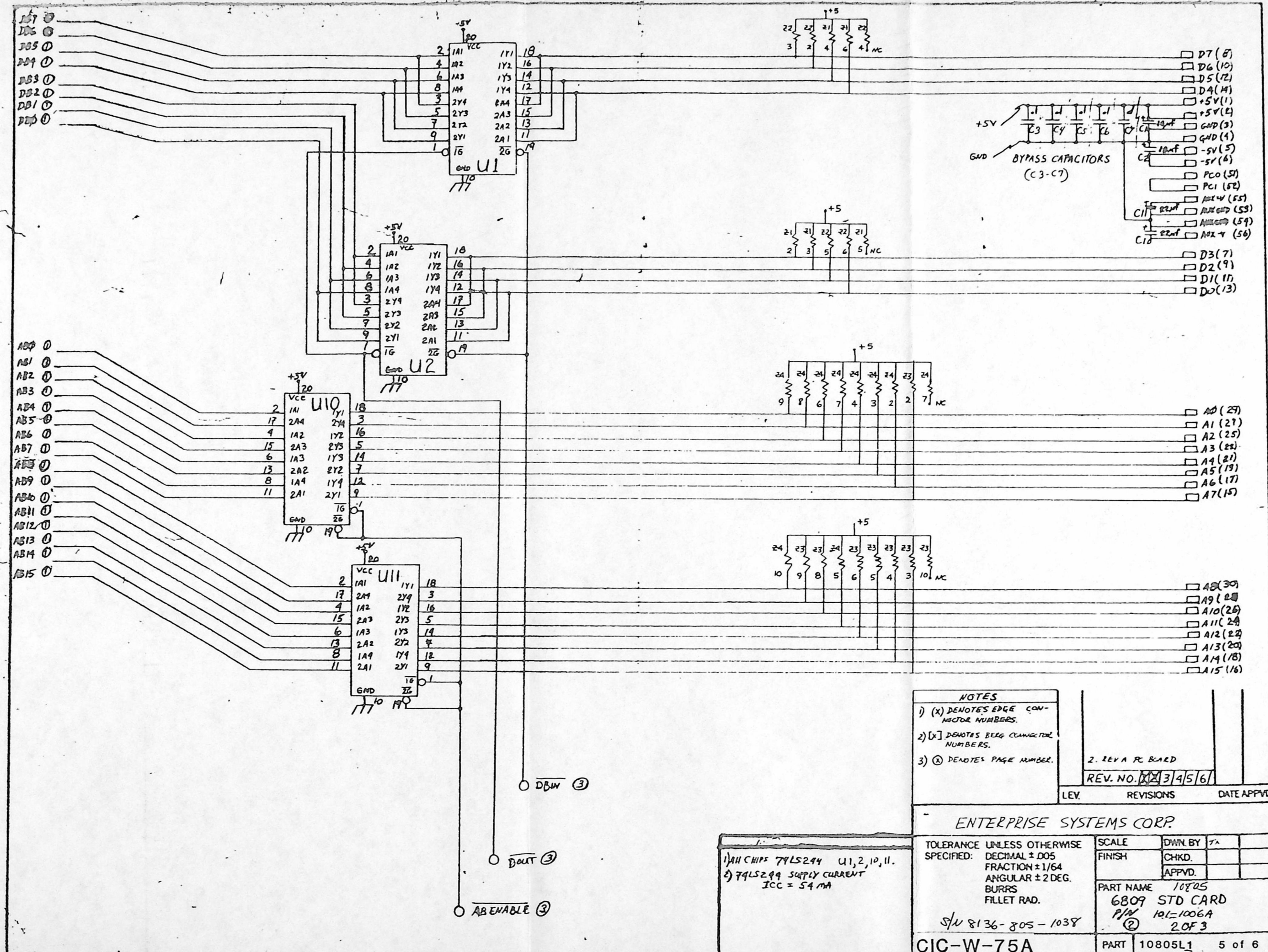
TOLERANCES UNLESS OTHERWISE SPECIFIED			
FRACTIONS	DEC	ANGLES	
±	±	±	
APPROVALS	DATE	ATA Corp. COMPUTER IMAGE 6809 MPU CONTROL PANEL-SYSTEM IV	
DRAWN	4-82		
CHECKED			
		CIC-W-75A	DRAWING NO.
		SIZE B	10805L1
DO NOT SCALE DRAWING		SHEET 3 of 6	

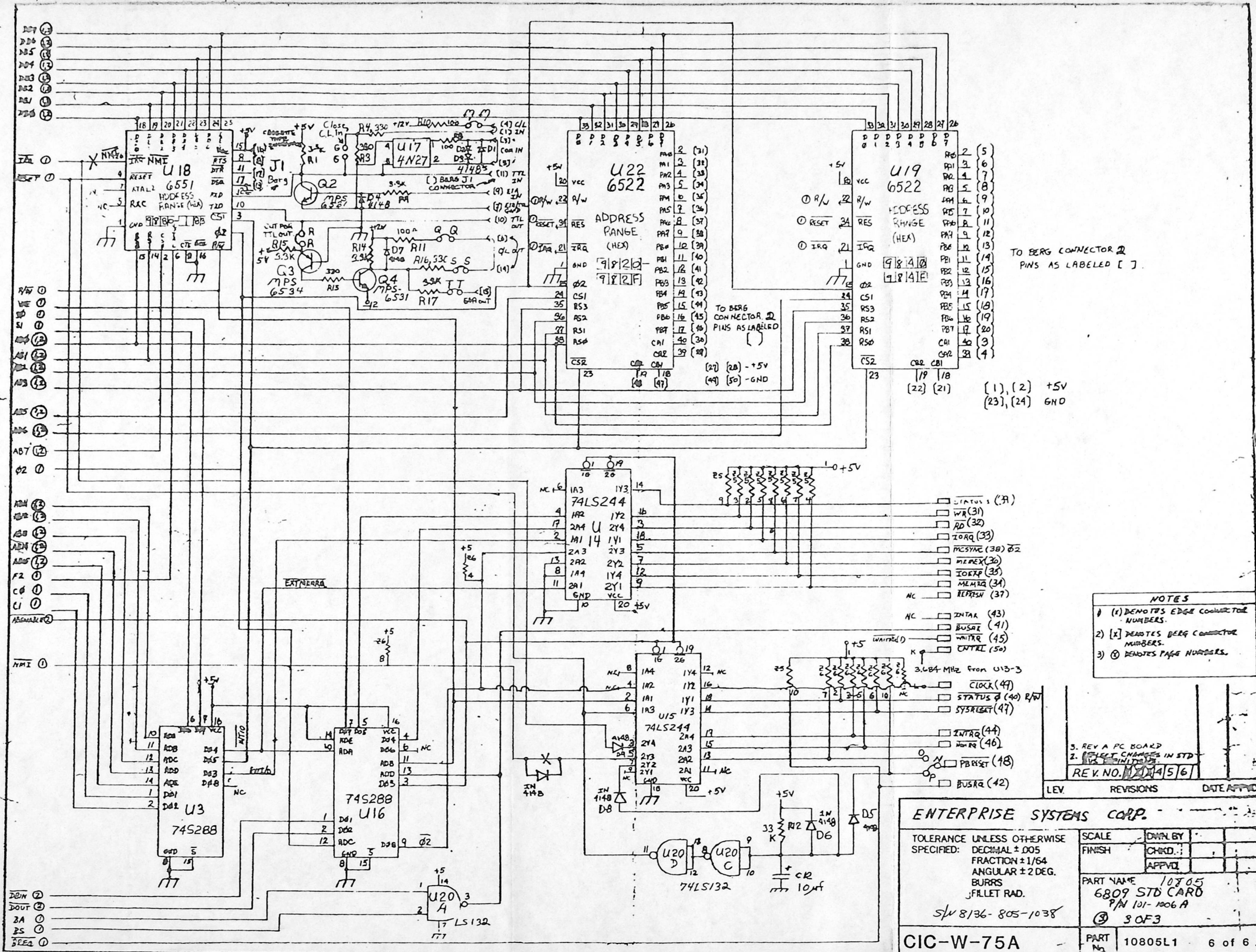


NOTES
1 (X) DENOTES BOARD CONSTRUCTION
2 (X) DENOTES BOARD CONSTRUCTION
3 (X) DENOTES PAGE NUMBER

NOTES
CONNECT JUMPER 2752 2756 2708
CORRESPONDING
TO EPROM USED JUMPER
JUMPER SHOWN FOR 2756

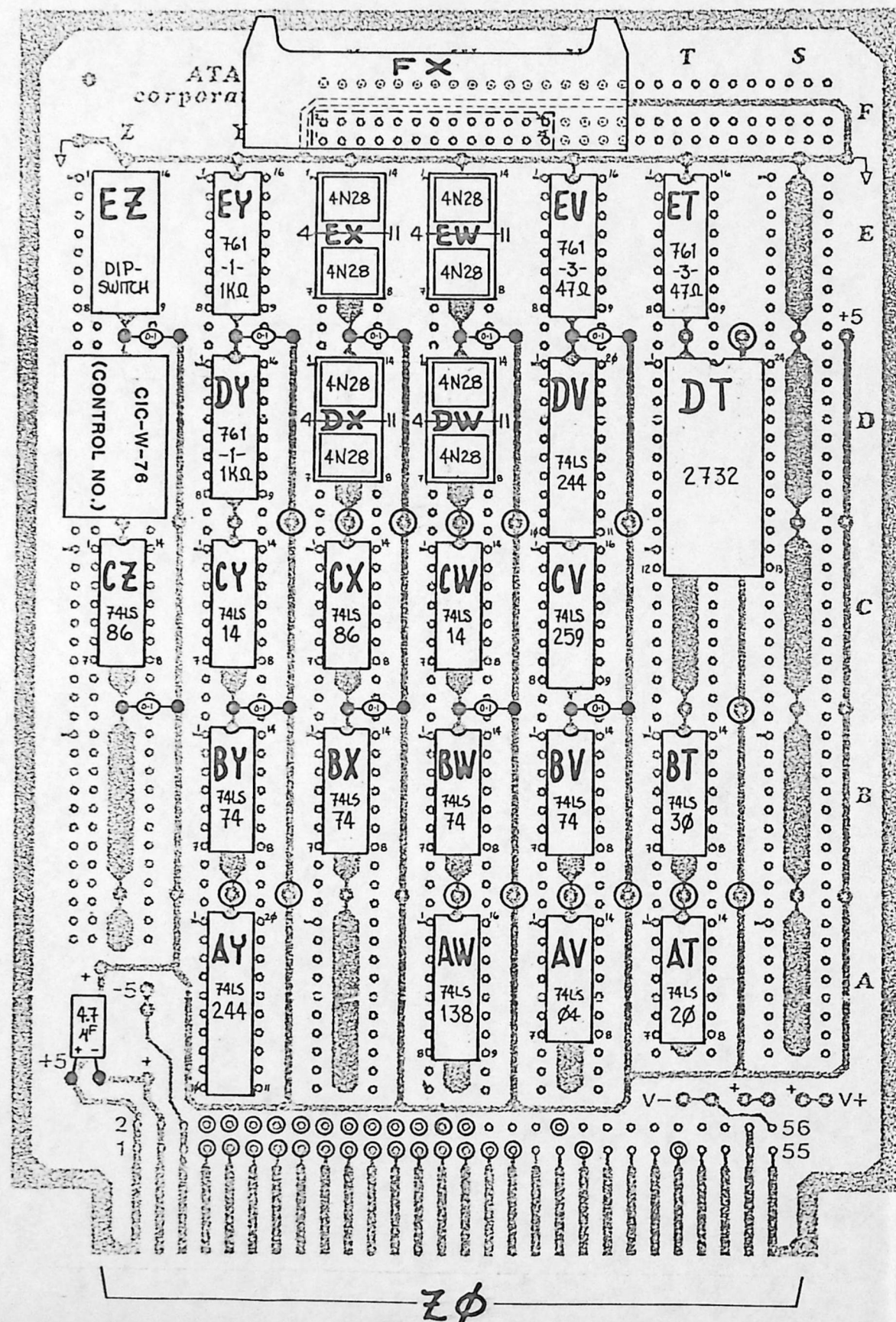
ENTERPRISE SYSTEMS CORP.			
TOLERANCE UNLESS OTHERWISE SPECIFIED:		SCALE	DWN. BY
DECIMAL ± .005		FINISH	CHKD.
FRACTION ± 1/64		APPVD.	
ANGULAR ± 2 DEG.		PART NAME	
BURRS		6809 STD CARD	
FILLET RAD.		101-1006A	
S/N 8136-805-1038		1 OF 3	
CIC-W-75A		C-10805L1 4 of 6	





[illegible]

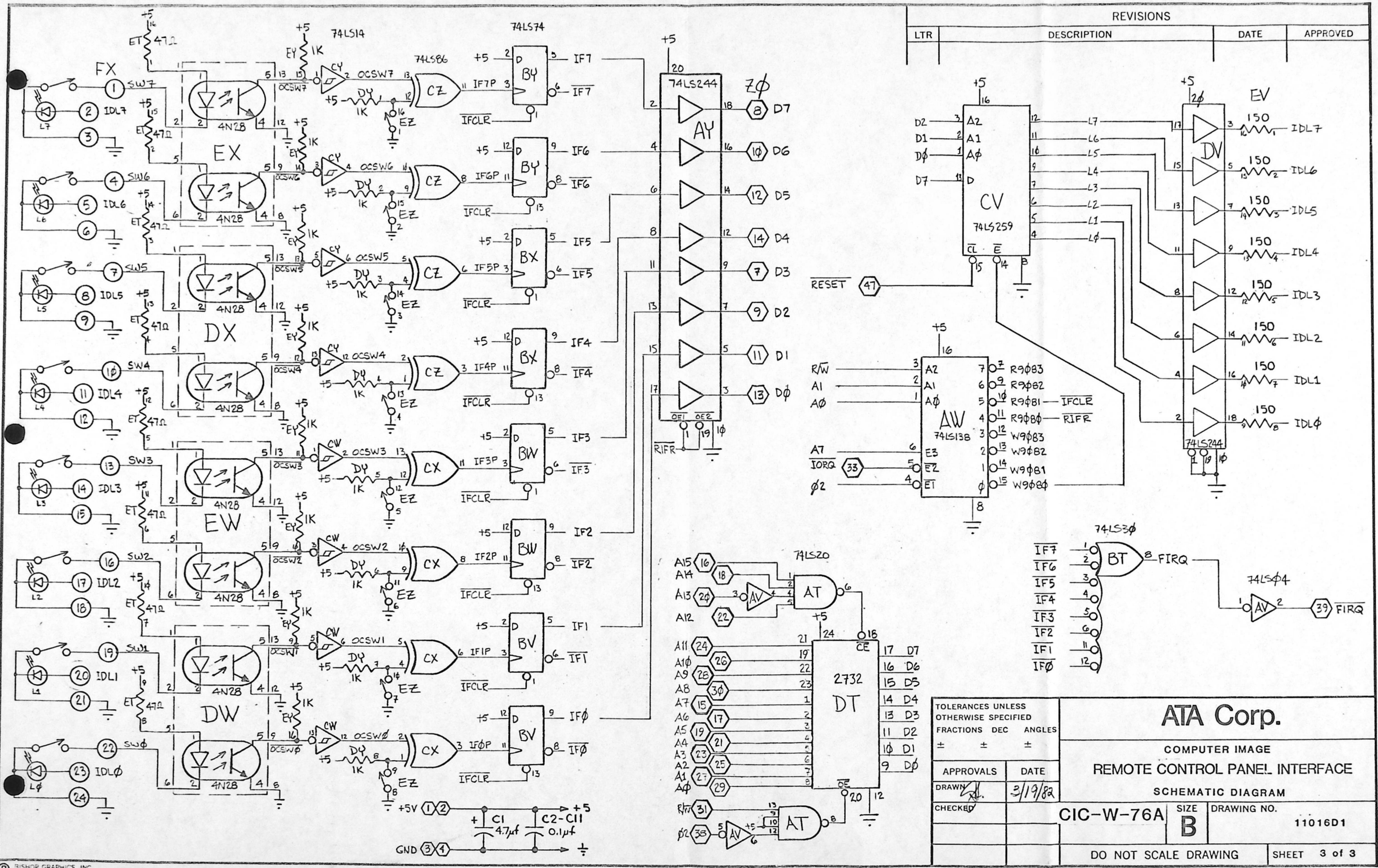
REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED



NOTE:
EX,EW, 4 — II = DO NOT INSERT PINS
DX,DW
● = SOCKET PIN
○,○ = PIN

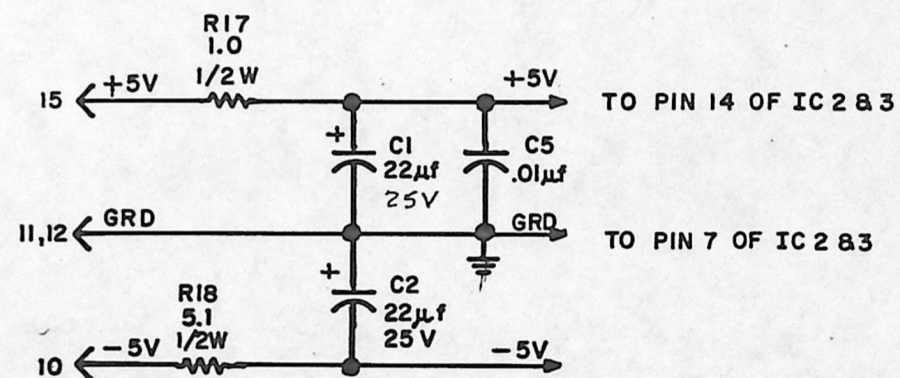
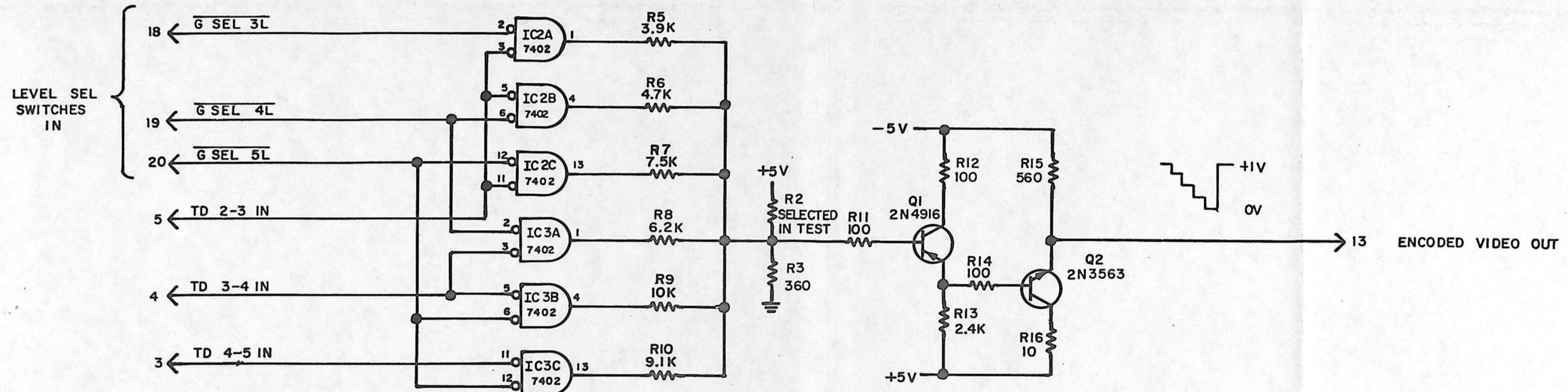
TOLERANCES UNLESS OTHERWISE SPECIFIED			
FRACTIONS	DEC	ANGLES	
±	±	±	
APPROVALS		DATE	
DRAWN <i>SP</i>		4-1-82	
CHECKED			

ATA Corp.			
COMPUTER IMAGE			
REMOTE CONTROL PANEL INTERFACE			
BOARD LAYOUT			
CIC-W-76A	SIZE B	DRAWING NO.	11016D1
DO NOT SCALE DRAWING		SHEET 2 of 3	



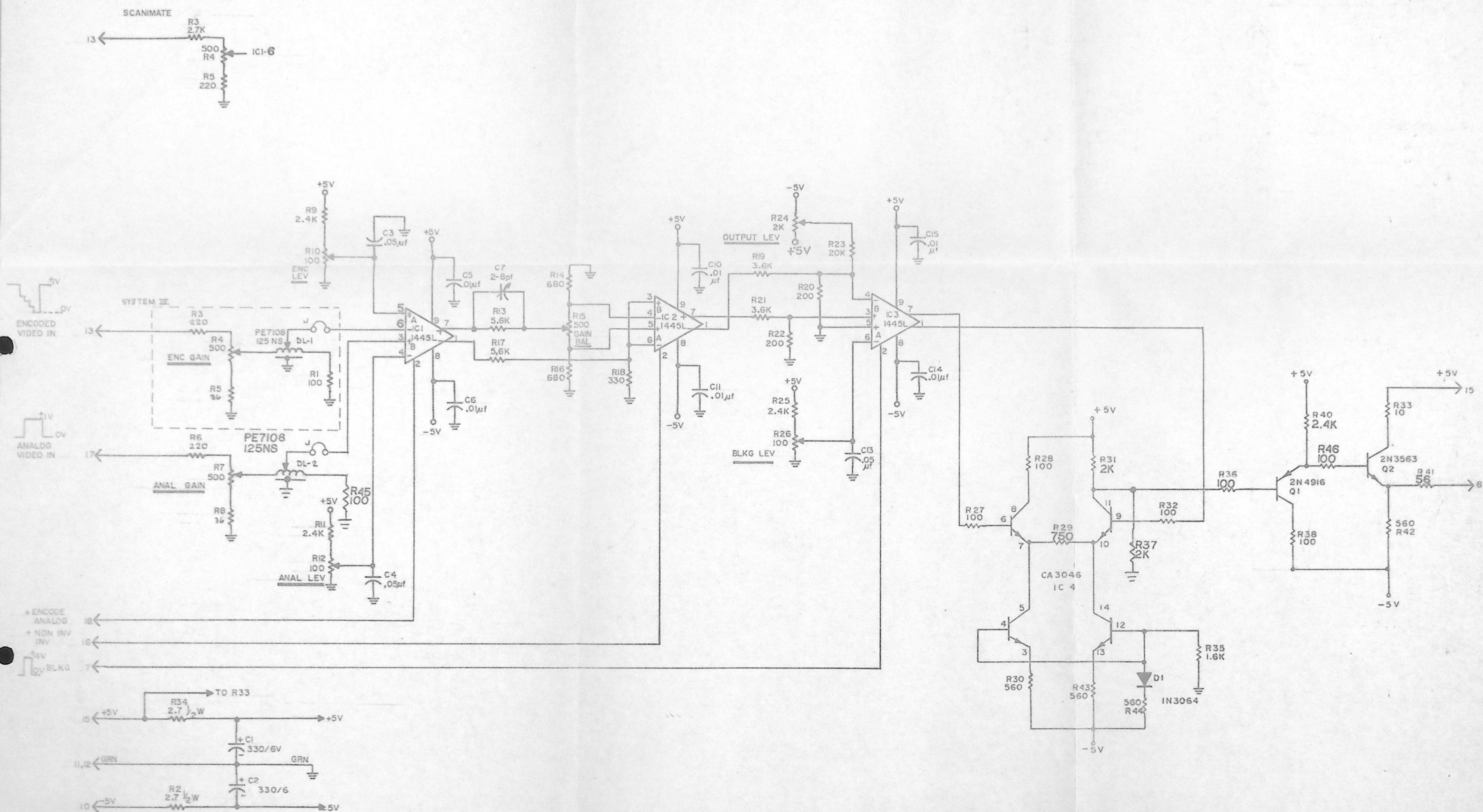
REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

TOLERANCES UNLESS OTHERWISE SPECIFIED			
FRACTIONS	DEC	ANGLES	
±	±	±	
ATA Corp.			
COMPUTER IMAGE			
REMOTE CONTROL PANEL INTERFACE			
SCHEMATIC DIAGRAM			
APPROVALS	DATE	CIC-W-76A	DRAWING NO.
DRAWN	3/19/82	SIZE B	11016D1
CHECKED			
DO NOT SCALE DRAWING			
SHEET 3 of 3			

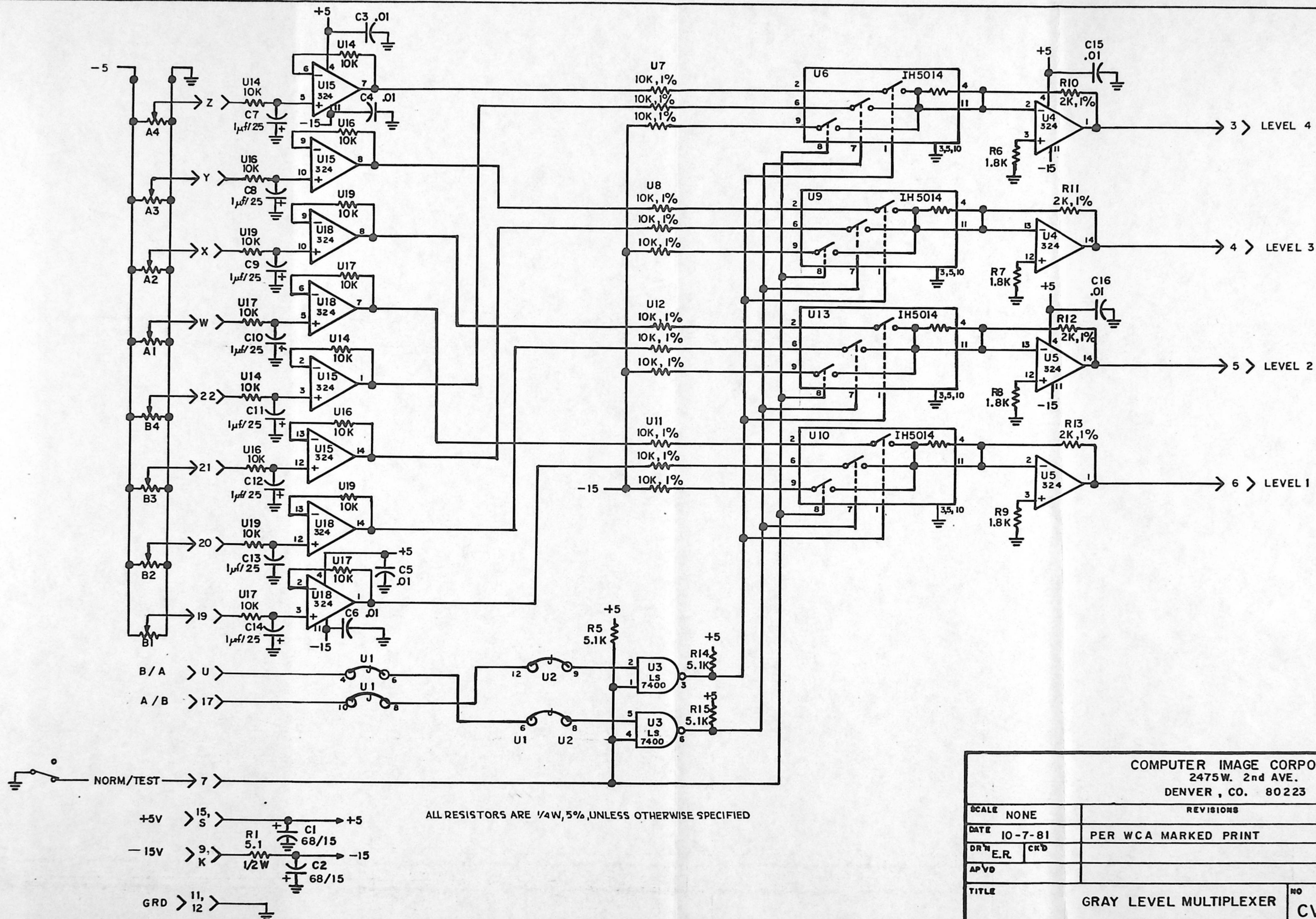


NOTE
ALL RESISTORS ARE 1/4 WATT ±5%, UNLESS OTHERWISE SPECIFIED.

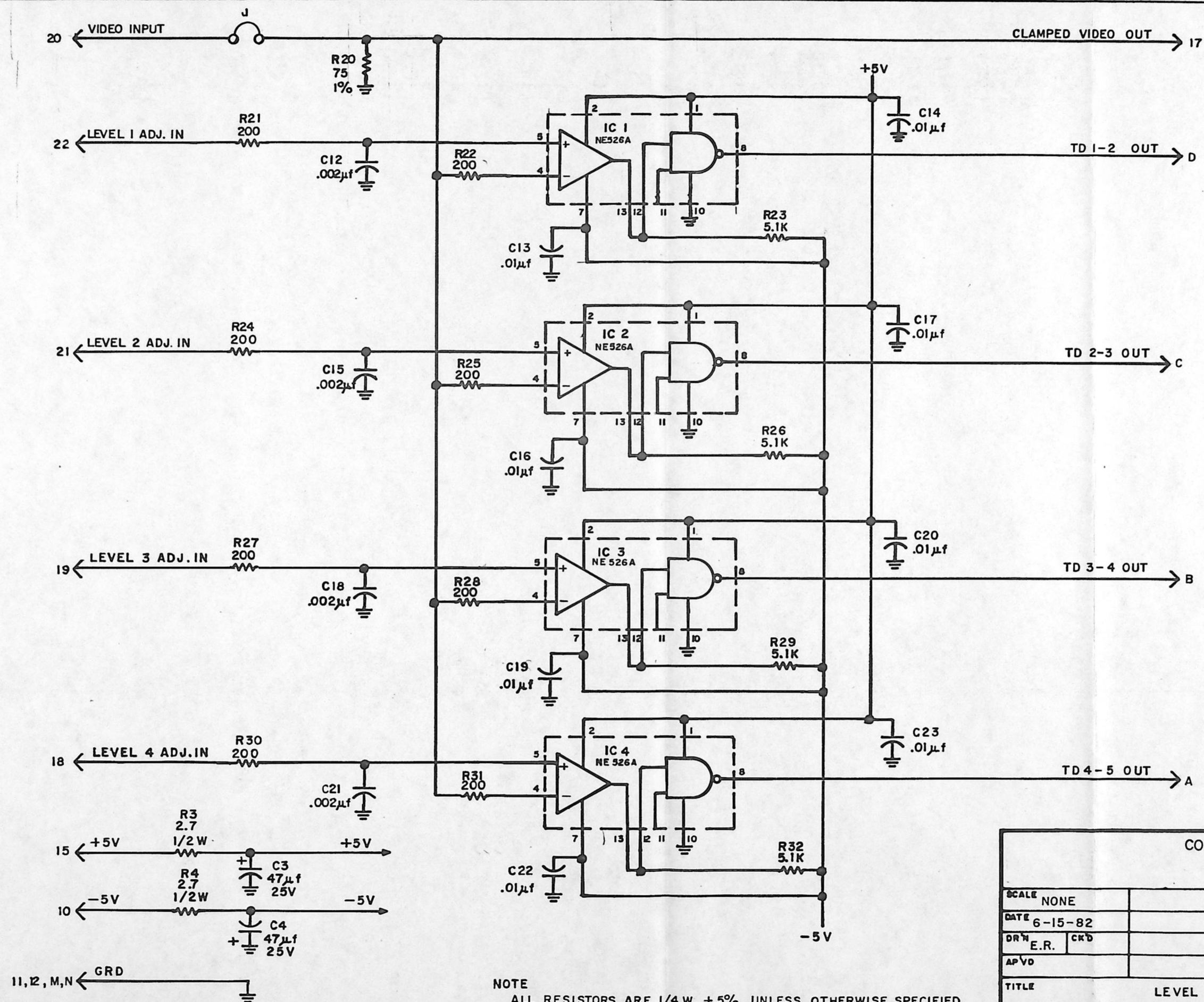
COMPUTER IMAGE CORPORATION 2475 W. 2nd AVE DENVER, CO. 80223			
SCALE NONE	REVISIONS	BY	DATE
DATE 6-19-82			
DRN E.R.	CKD		
APVD			
TITLE GRAY LEVEL SWITCHES		NO CVS-111B-1	



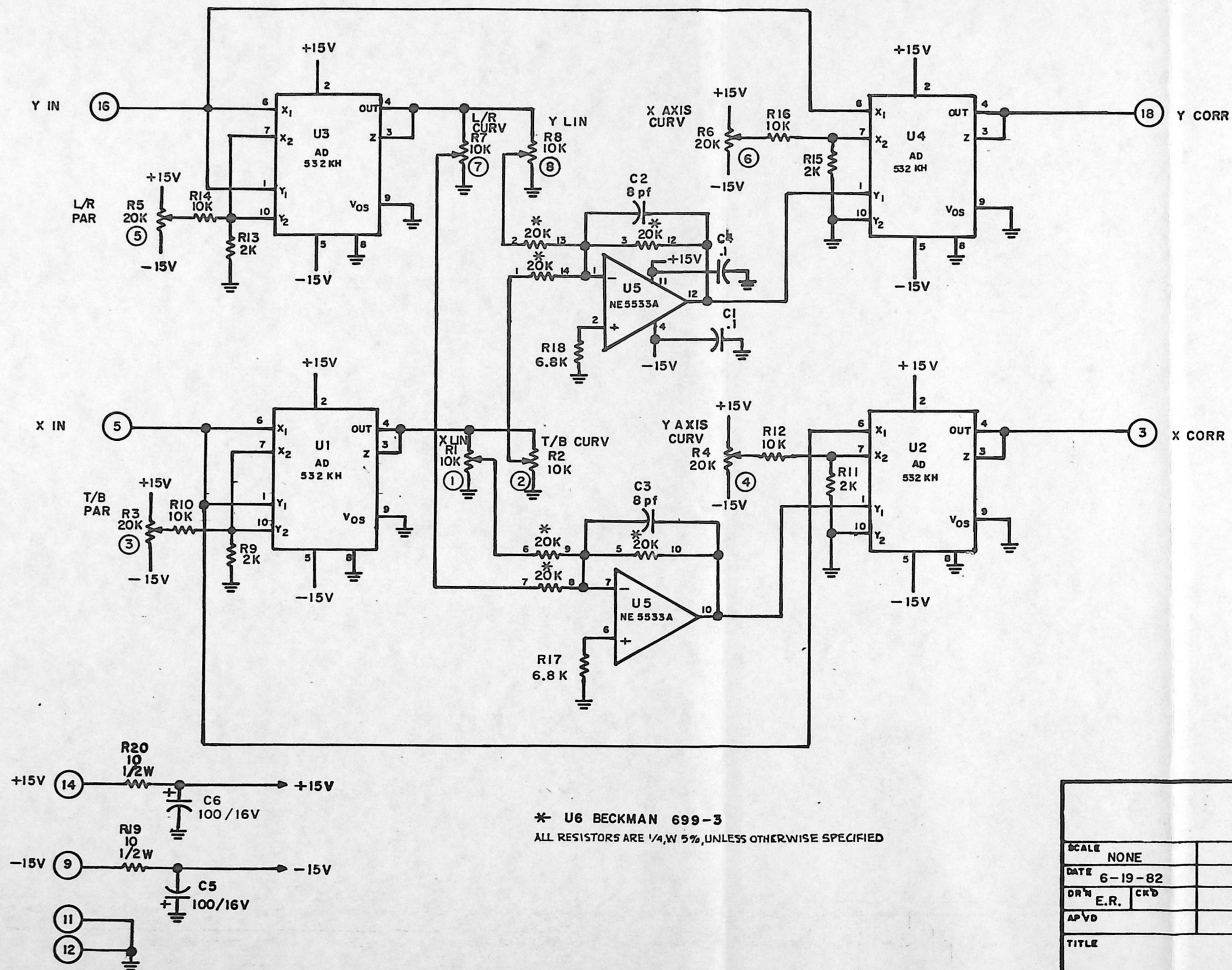
COMPUTER IMAGE CORPORATION		2475 W. 2nd AVE. DENVER, COLORADO 80223	
SCALE	NONE	REVISIONS	DATE
DATE	11/20/75	REV "B"	DM 11-18-75
DR	ADM	REV "C"	DJA 3-11-80
TITLE		CVS-112C	
GRAY LEVEL ENCODER VIDEO AMPS			



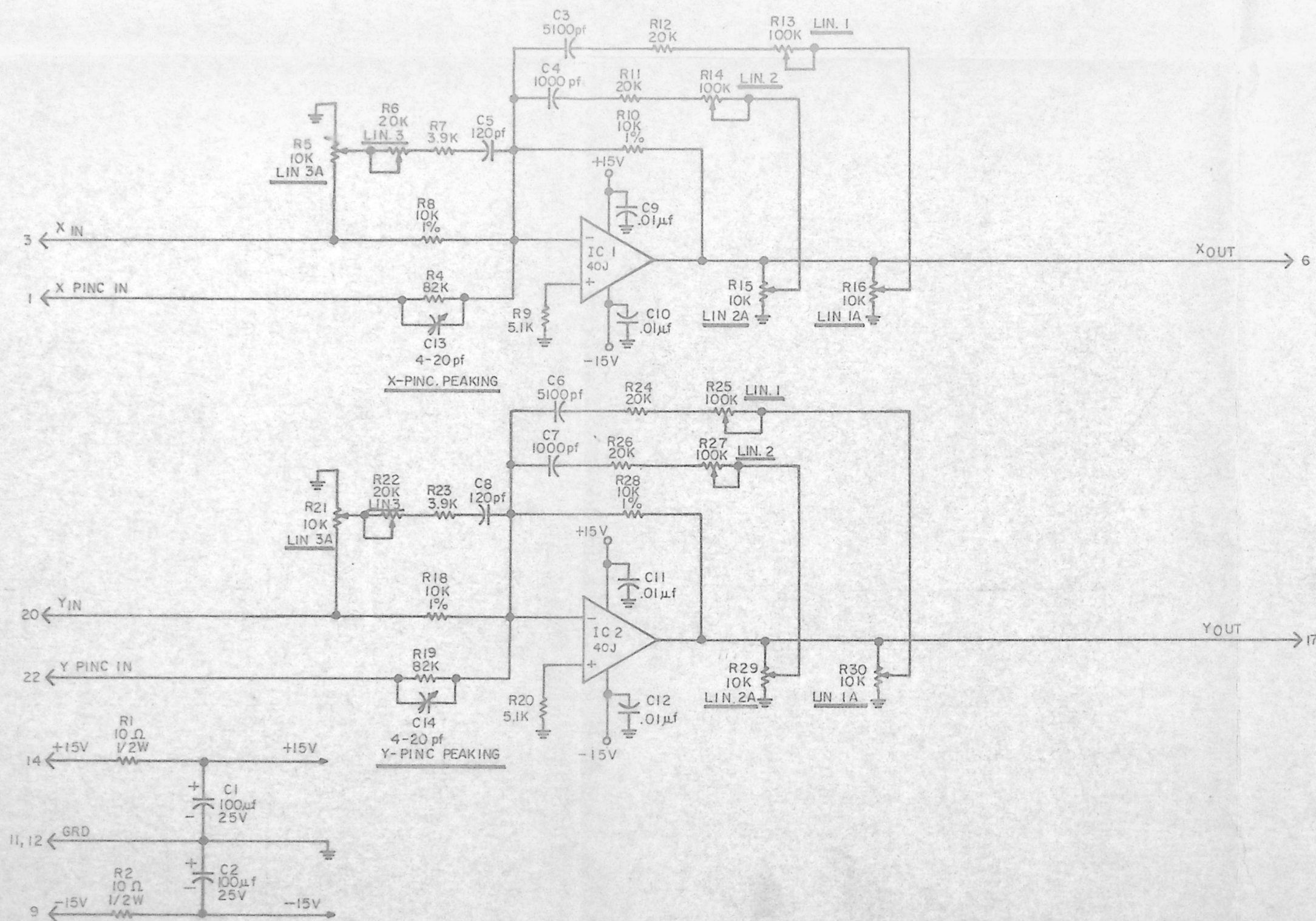
COMPUTER IMAGE CORPORATION 2475 W. 2nd AVE. DENVER, CO. 80223			
SCALE NONE	REVISIONS	BY	DATE
DATE 10-7-81	PER WCA MARKED PRINT	E.R.	4-27-82
DRW E.R.	CRD		
APVD			
TITLE		NO	
GRAY LEVEL MULTIPLEXER		CVS-114C-2	



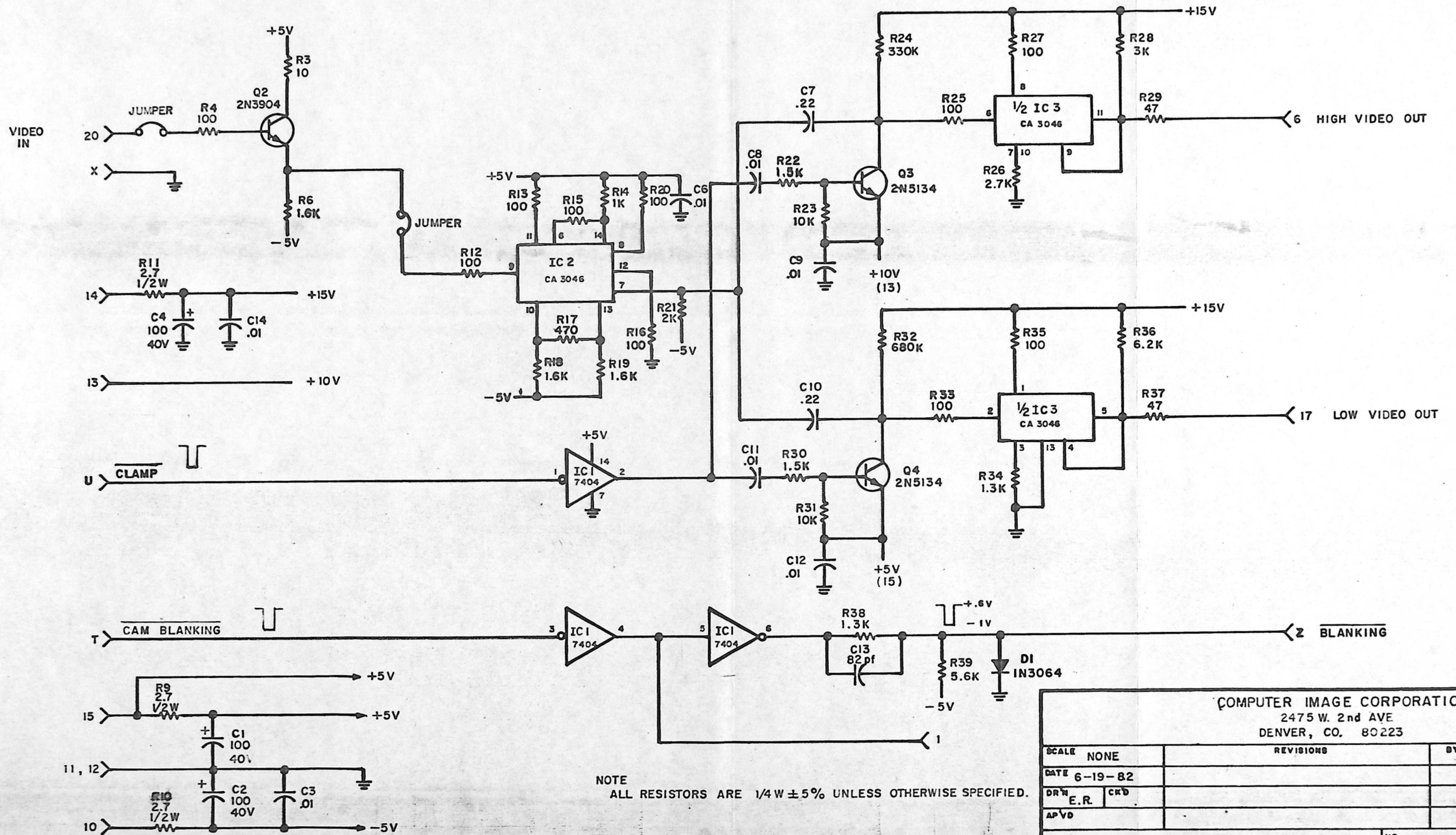
COMPUTER IMAGE CORPORATION			
2475 W. 2nd AVE			
DENVER, CO. 80223			
SCALE NONE	REVISIONS		BY DATE
DATE 6-15-82			
DRN E.R.	CKD		
APVD			
TITLE	LEVEL DETECTORS VIDEO PROCESSOR		NO CVS-125A-2



COMPUTER IMAGE CORPORATION			
2475 W. 2nd AVE			
DENVER, CO. 80223			
SCALE	NONE	REVISIONS	BY DATE
DATE	6-19-82		
DRN	E.R.	CRD	
APVD			
TITLE	SYSTEM IV MON. PINCUSHION CORRECTION		NO CVS-127A-2



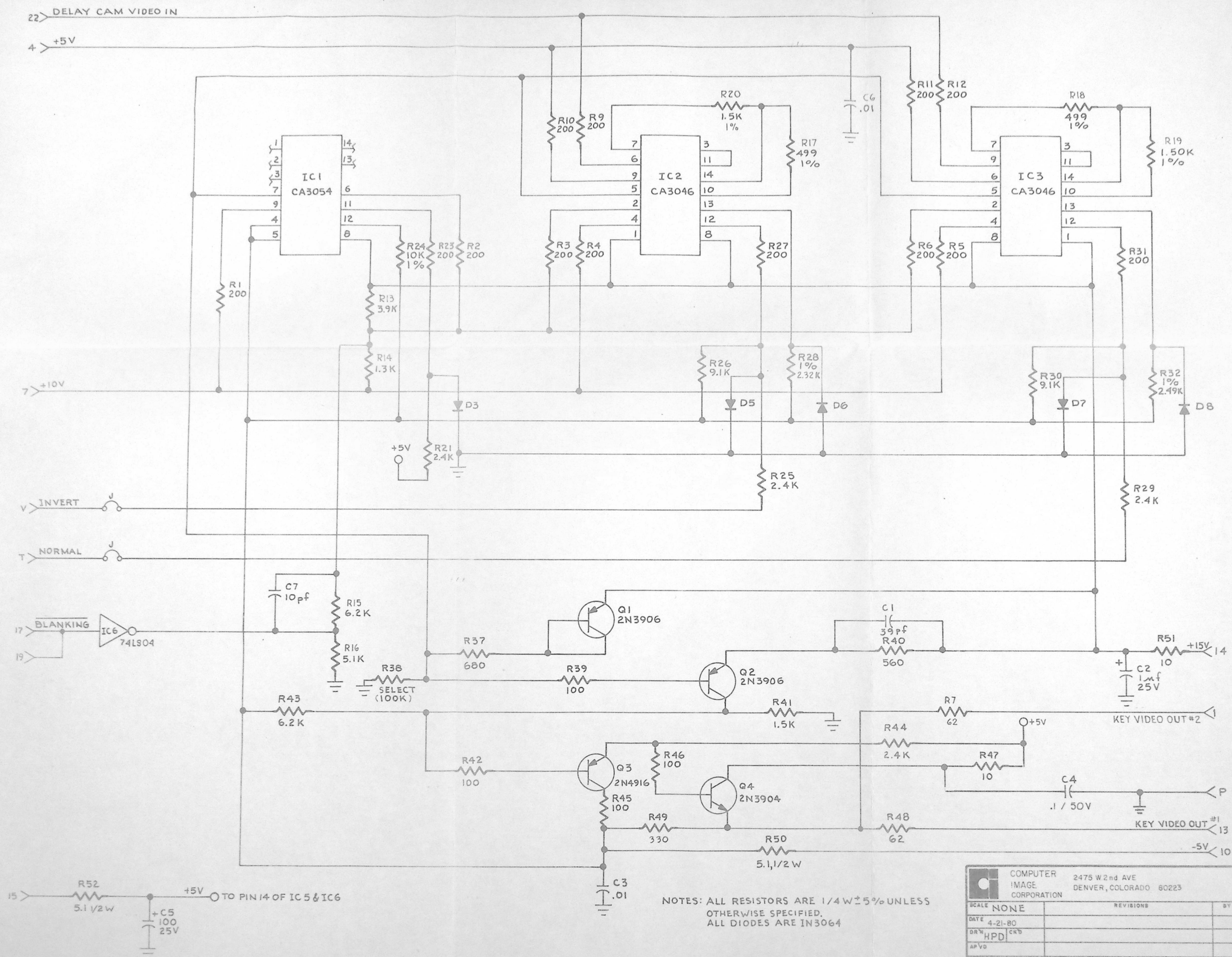
COMPUTER IMAGE CORPORATION 2475 W. 2nd AVE. DENVER, COLORADO 80223	
SCALE: NONE DATE: 10-19-72 BY: E. R. AP: 10	REVISION: BY: DATE: NO. CVS-128



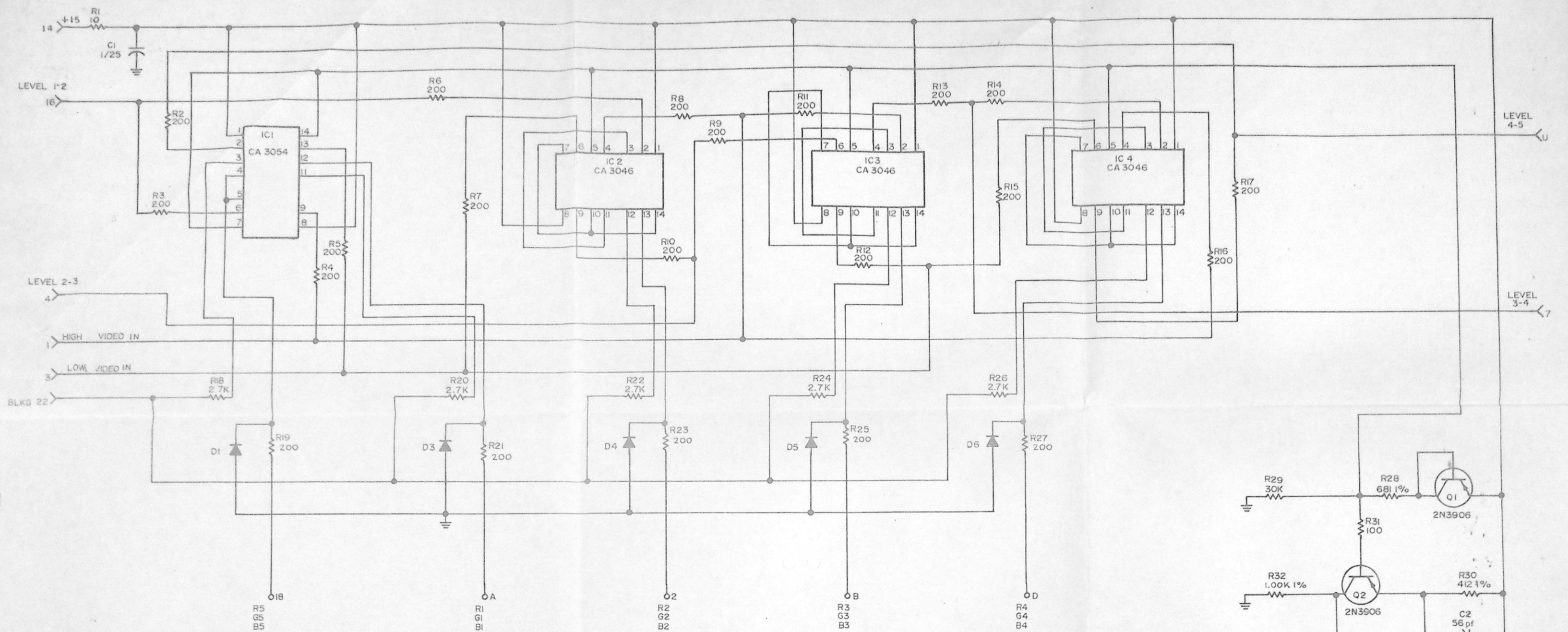
NOTE
ALL RESISTORS ARE 1/4 W $\pm 5\%$ UNLESS OTHERWISE SPECIFIED.

COMPUTER IMAGE CORPORATION
2475 W. 2nd AVE
DENVER, CO. 80223

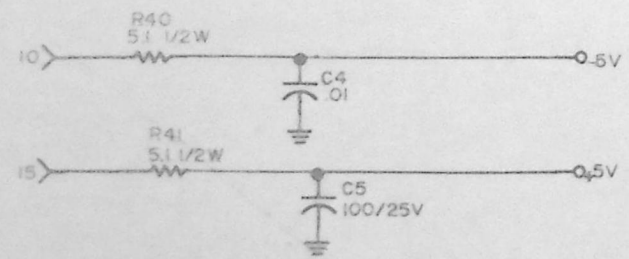
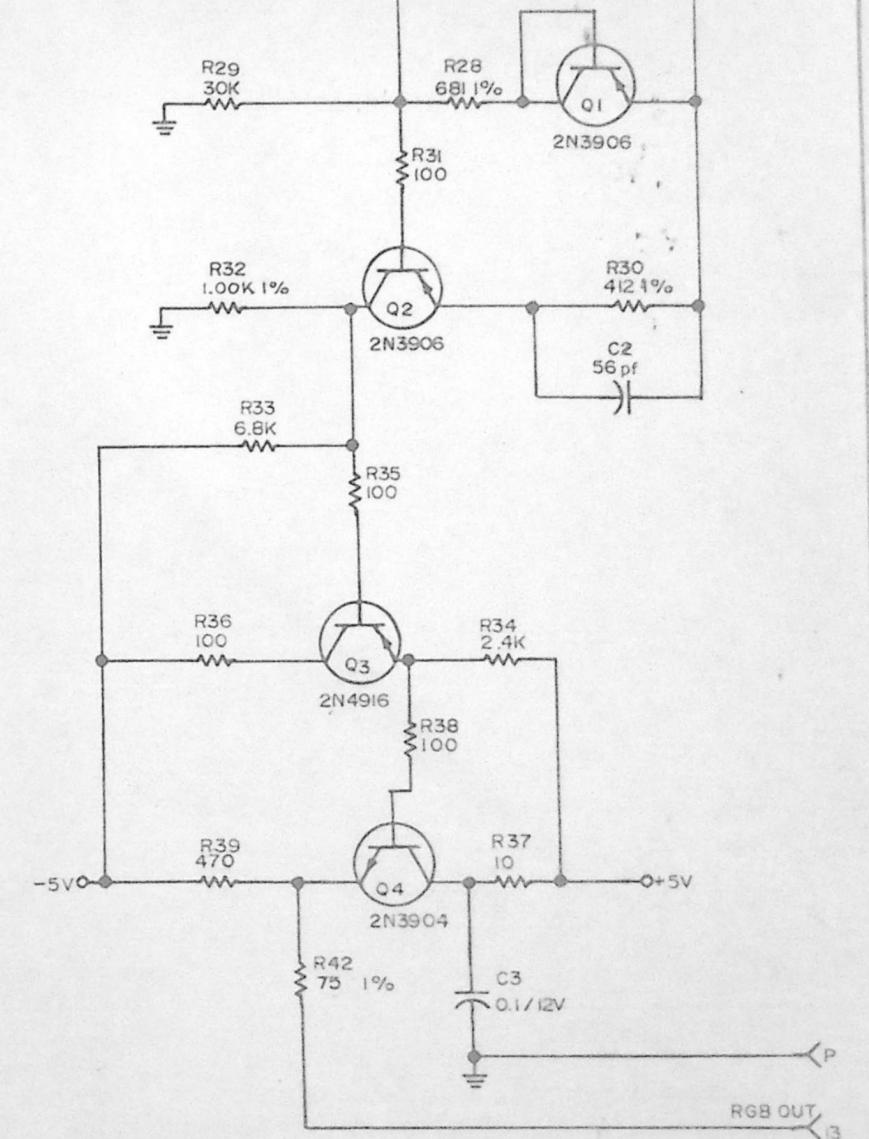
SCALE	NONE	REVISIONS	BY	DATE
DATE	6-19-82			
DRN	E.R.	CRD		
APVD				
TITLE	INPUT AMP			NO
	CVS-134-4			



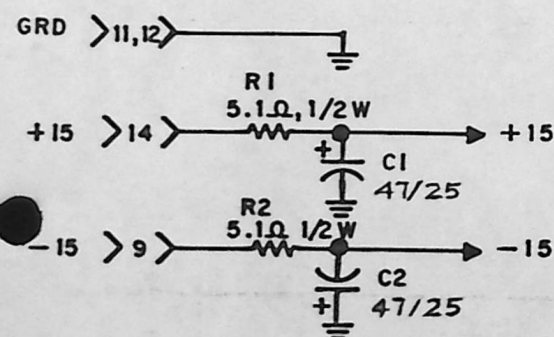
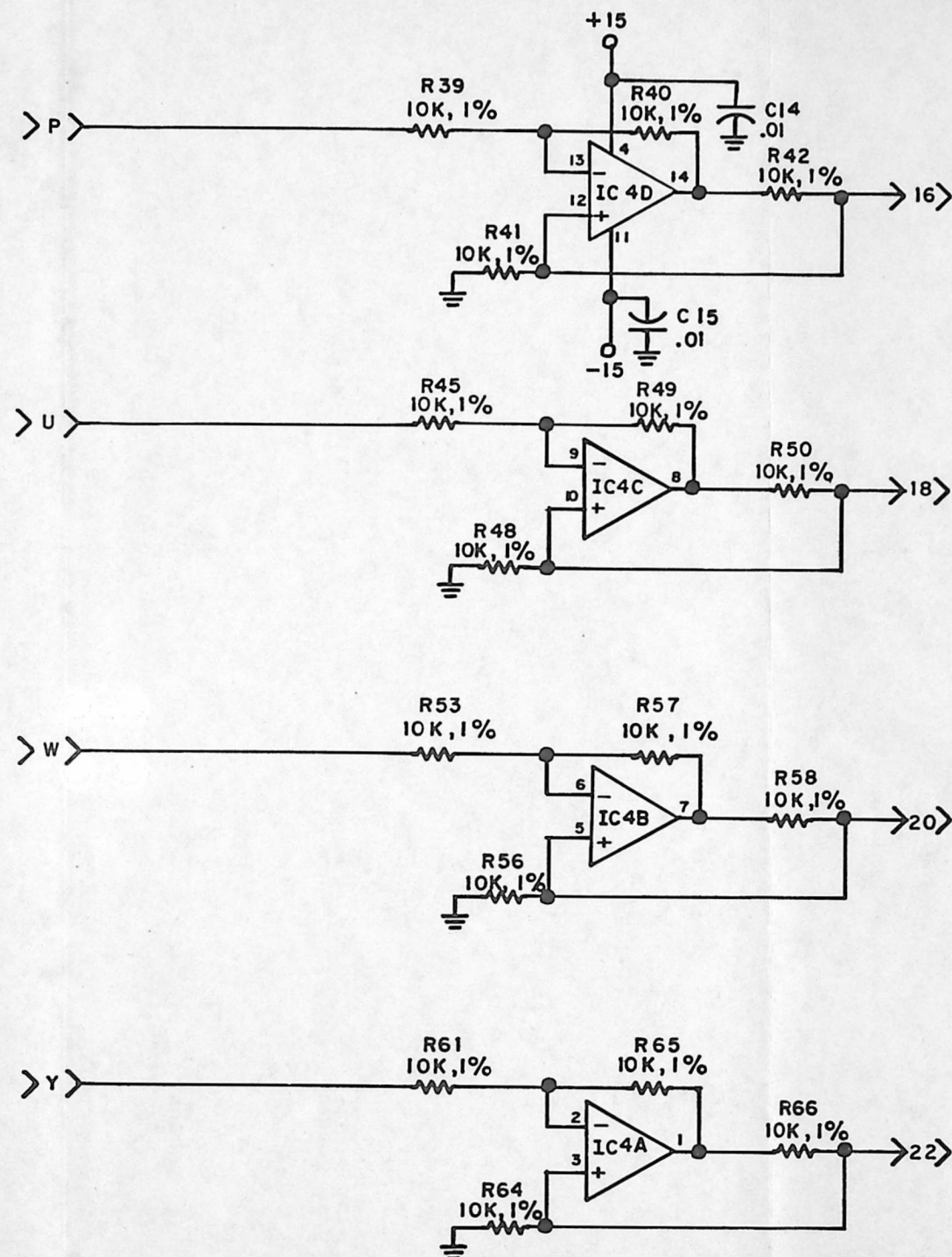
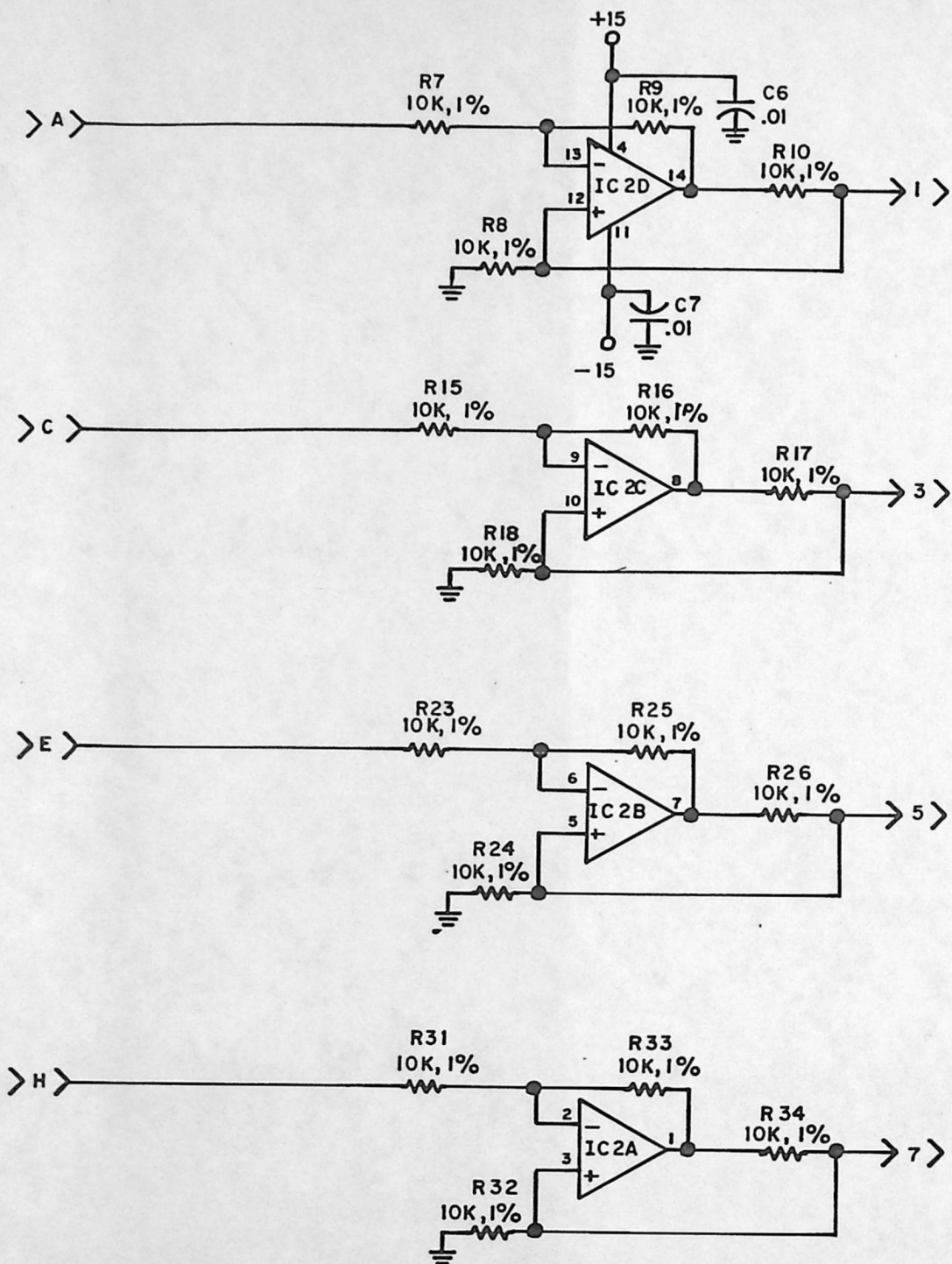
		COMPUTER IMAGE CORPORATION 2475 W 2nd AVE DENVER, COLORADO 80223	
SCALE	NONE	REVISIONS	BY
DATE	4-21-80		
DRN	HPD	CND	
APVD			
TITLE	BACKGROUND COMPARATORS		NP
			CVS-135B-1



"NOTES"
ALL RESISTORS ARE 1/4W ±5% UNLESS OTHERWISE SPECIFIED
ALL DIODES ARE 1N3064

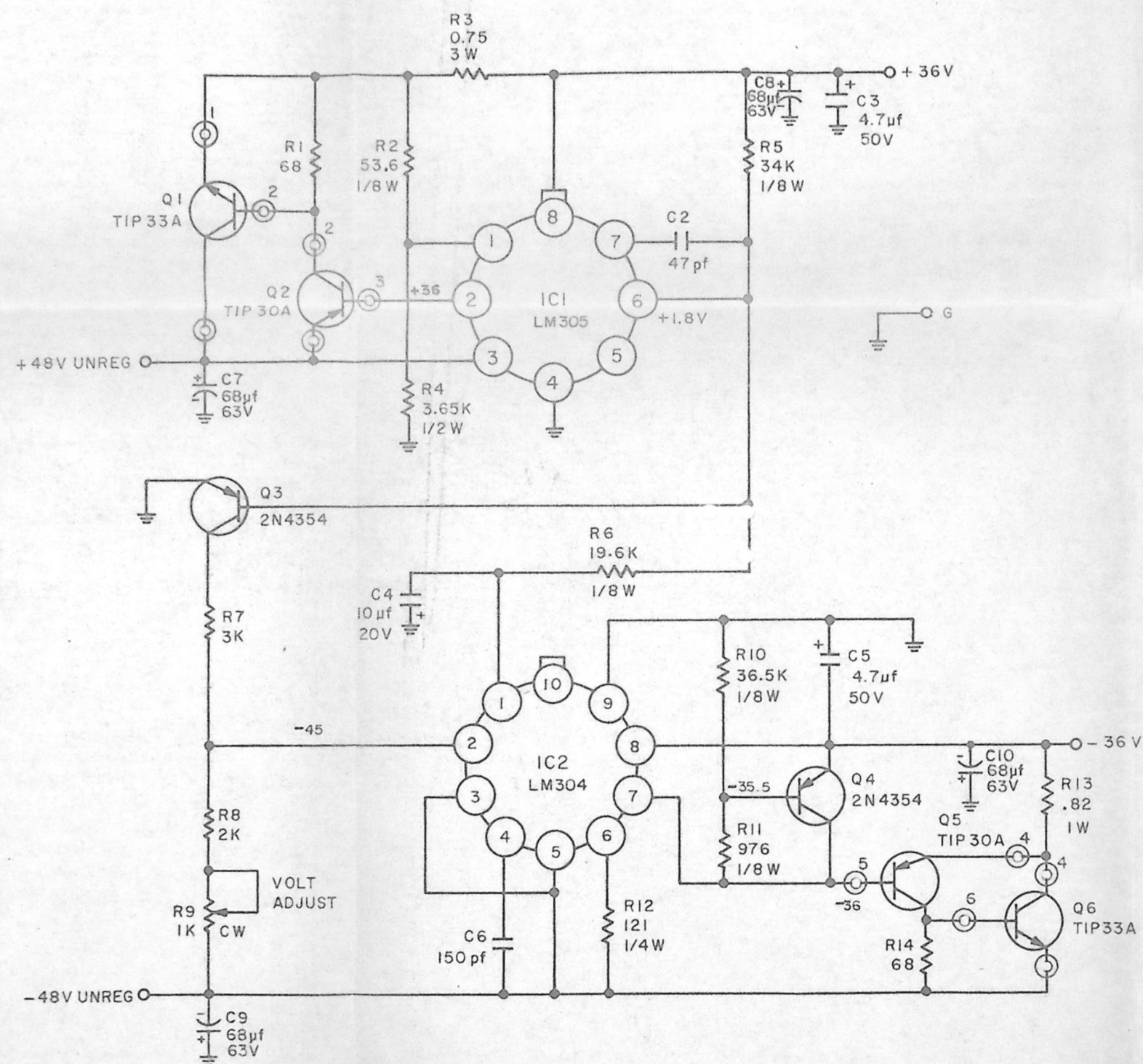


COMPUTER IMAGE			
SCALE	NONE	REVISION	
DATE	11/29/73	BY	
DESIGNER	R.K.P.	CHECKED	
COLOR COMPARATOR		CVS-136-2	



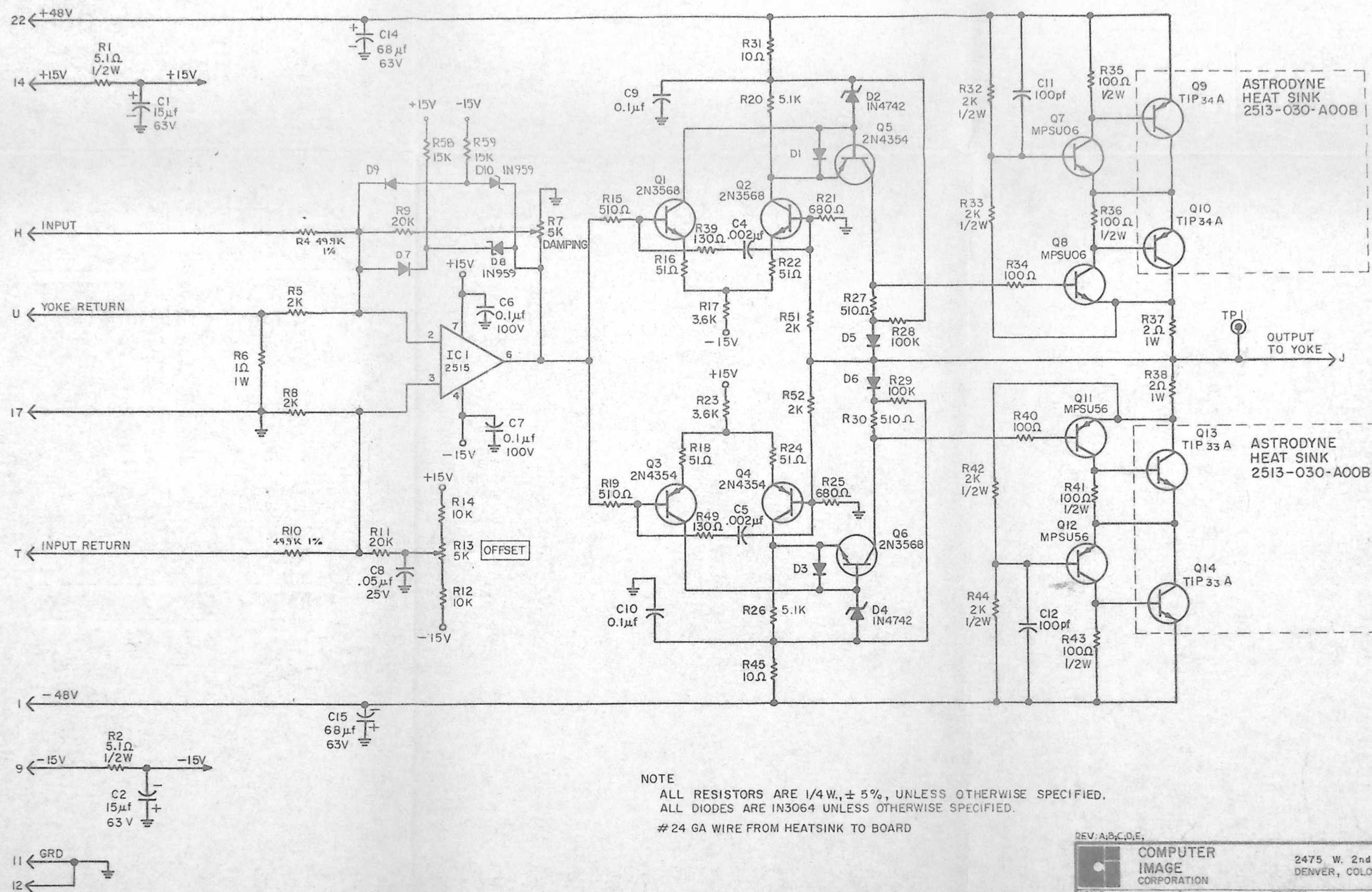
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS ARE 1/4 WATT, $\pm 5\%$
ALL CAPACITORS ARE IN μf
ALL OP AMPS ARE TL084ACN

COMPUTER IMAGE CORPORATION			
2475 W. 2nd AVE. DENVER, CO. 80223			
SCALE NONE	REVISIONS	BY	DATE
DATE 6-29-81			
DRW E.R.	CHKD		
APVD			
TITLE COLOR MIXER SYSTEM IV	NO CVS-138-2		

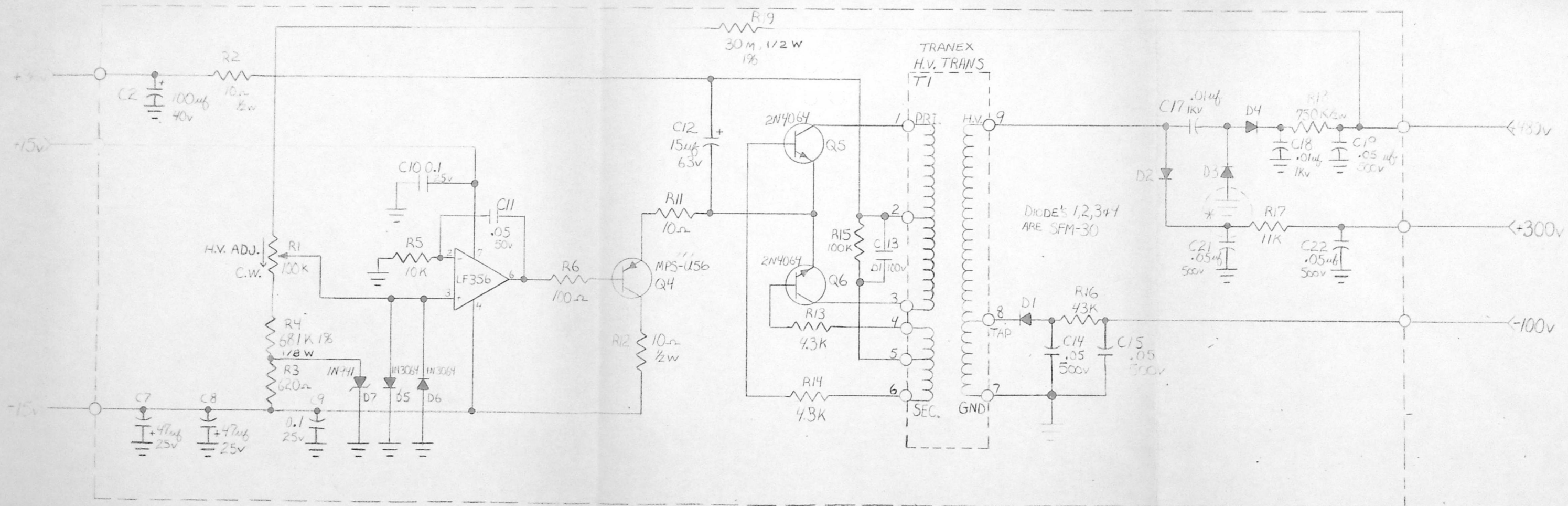
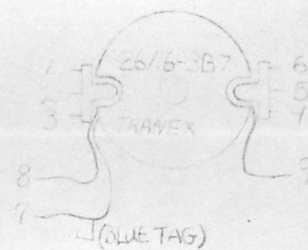


NOTE: Q1, Q2, Q5, Q6 MOUNTED ON DELTA NC-421K HEAT SINK.

COMPUTER IMAGE CORPORATION		2162 SOUTH JASON STREET, DENVER, COLORADO 80223	
SCALE	REVISION	REV	BY
DATE			R.K.P. 7-6-73
DR'N	CR'D		
AP'VD			
TITLE		NO.	
± 36 VOLT REGULATOR		SM-111A	



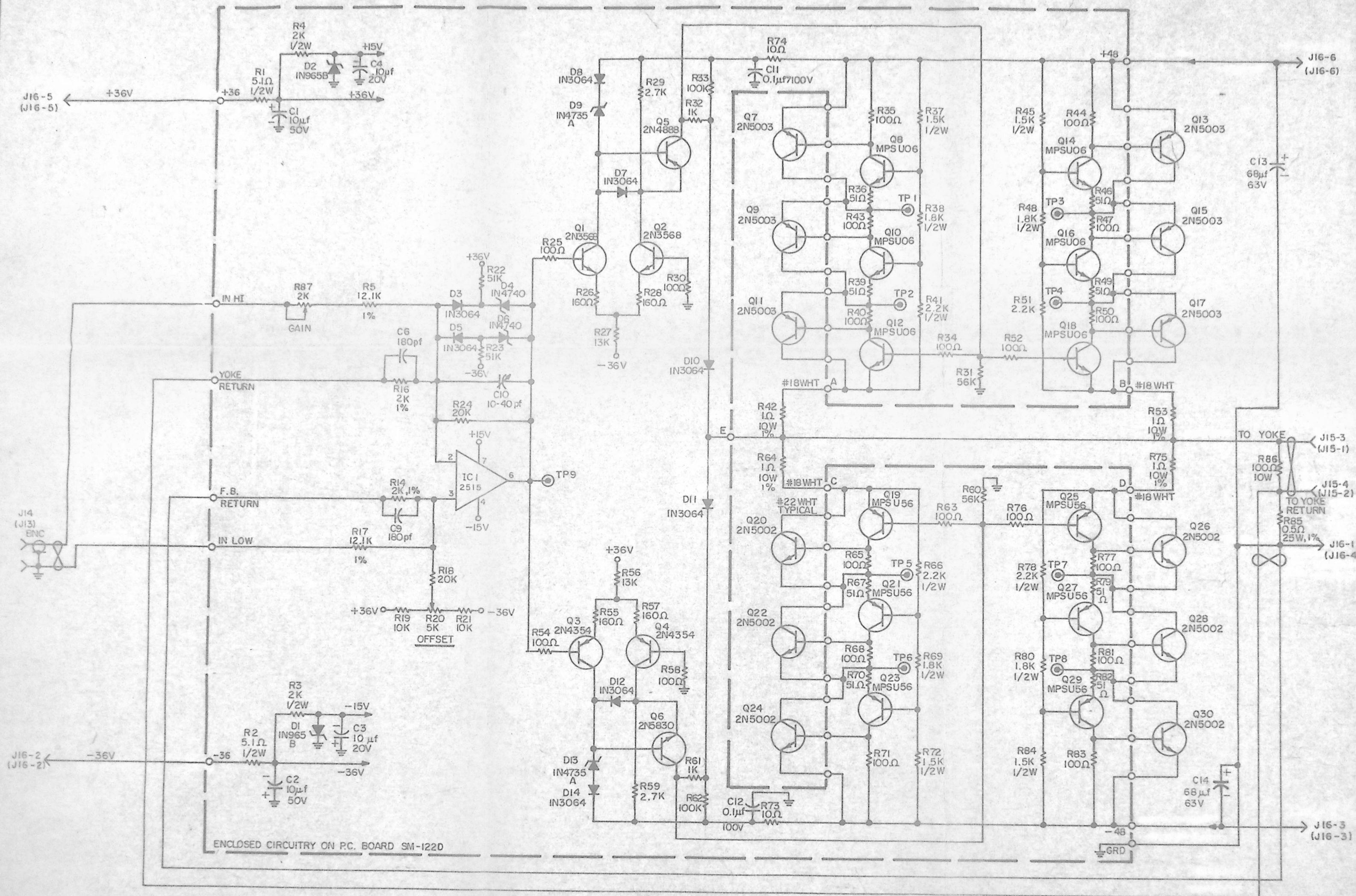
REV: A, B, C, D, E.		COMPUTER IMAGE CORPORATION		2475 W. 2nd AVE. DENVER, COLORADO 80223.	
SCALE	NONE	REVISION	D	BY	BA.
DATE	3-31-70	REVISION	E	DATE	1-6-72
DR'N.	E.R.	CHK'D.		AP'VD.	R.K.P.
TITLE				NO.	
CAMERA YOKE DRIVER				SM-117	
				SH 1 OF 1	



* INDICATES ETCH MODIFICATION ON SM121B BOARD

REV: A, B, C;

		2475 W. 2nd AVE. DENVER, COLORADO 80223	
SCALE	NONE	REVISIONS	BY
DATE	DEC 8 80		
DR'N	SD	CK'D	
AP'VD			
TOLERANCE FRACT ± 1/32 XX ± .015 XXX ± .005		TITLE CAMERA HIGH VOLTAGE POWER SUPPLY	
		NO SM-121 SH 1 OF 1	

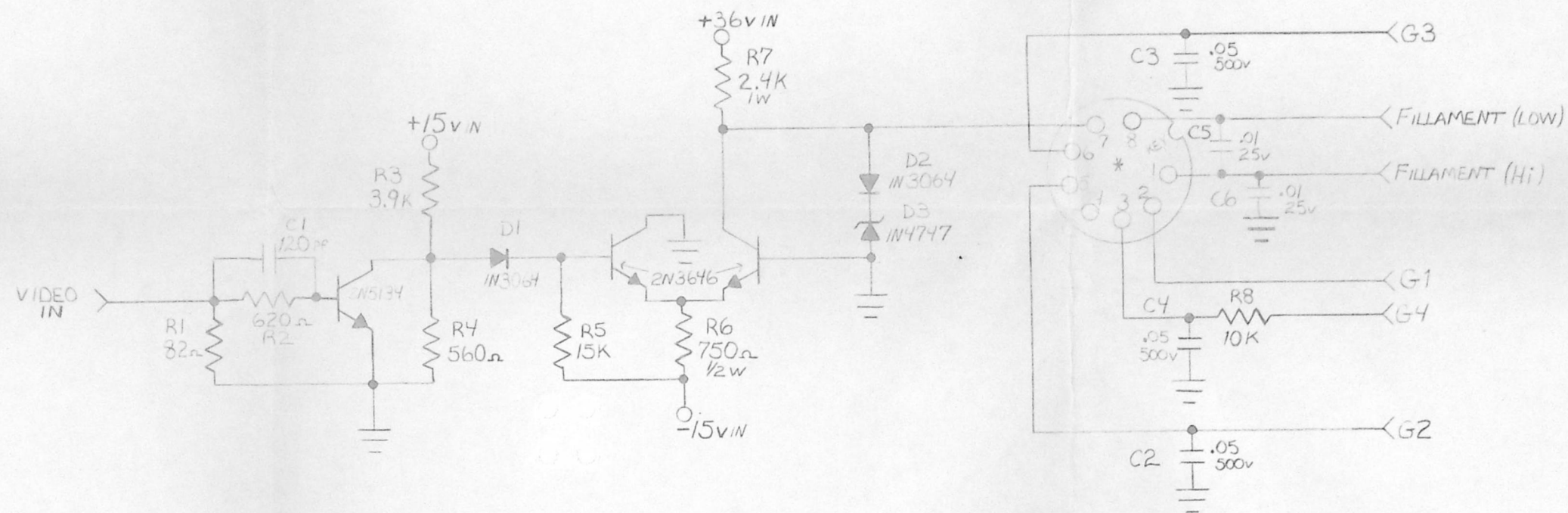


HEAT SINK
ASTRODYNE -2404-4

NOTE:
RESISTORS ARE 1/4W, UNLESS OTHERWISE SPECIFIED.

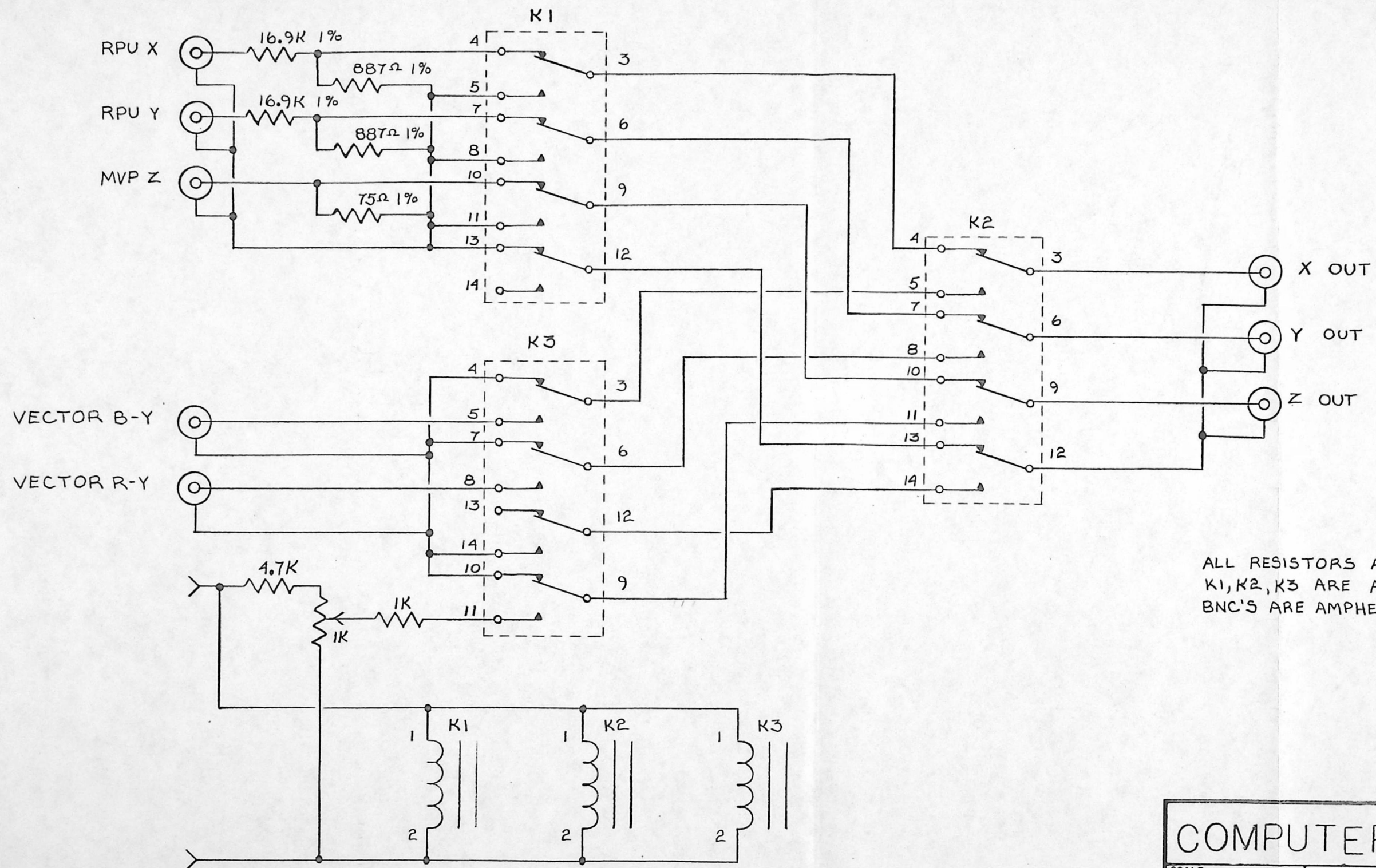
TWO COMPLETE CIRCUITS REQUIRED FOR ONE X AND Y DEFLECTION UNIT
PIN NUMBERS IN PARENTHESIS ARE FOR MON Y CHANNEL.
OTHER PIN NUMBERS ARE FOR MON X CHANNEL

COMPUTER IMAGE CORPORATION 2475 W. 2ND. AVE. DENVER, COLORADO 80223	
SCALE NONE	REVISION 9-2-71
DATE 9-2-71	BY E.R.
DRAWN E.R.	PER WCA MARKED PRINT
TITLE MONITOR X OR Y DEFLECTION AMPLIFIER SCHEMATIC	NO. SM-122D



*TUBE SOCKET: CINCH 8VT

		2475 W. 2nd AVE DENVER, COLORADO 80223	
SCALE	10X	REVISIONS	BY DATE
DATE	12-16-80		
DRN	SD	CHKD	
AP'VD			
TOLERANCE FRACT ± 1/32 XX ± .015 XXX ± .005		TITLE OVERLAP WHITE VIDEO AMP. NO 5M-151	

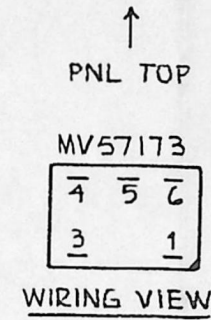
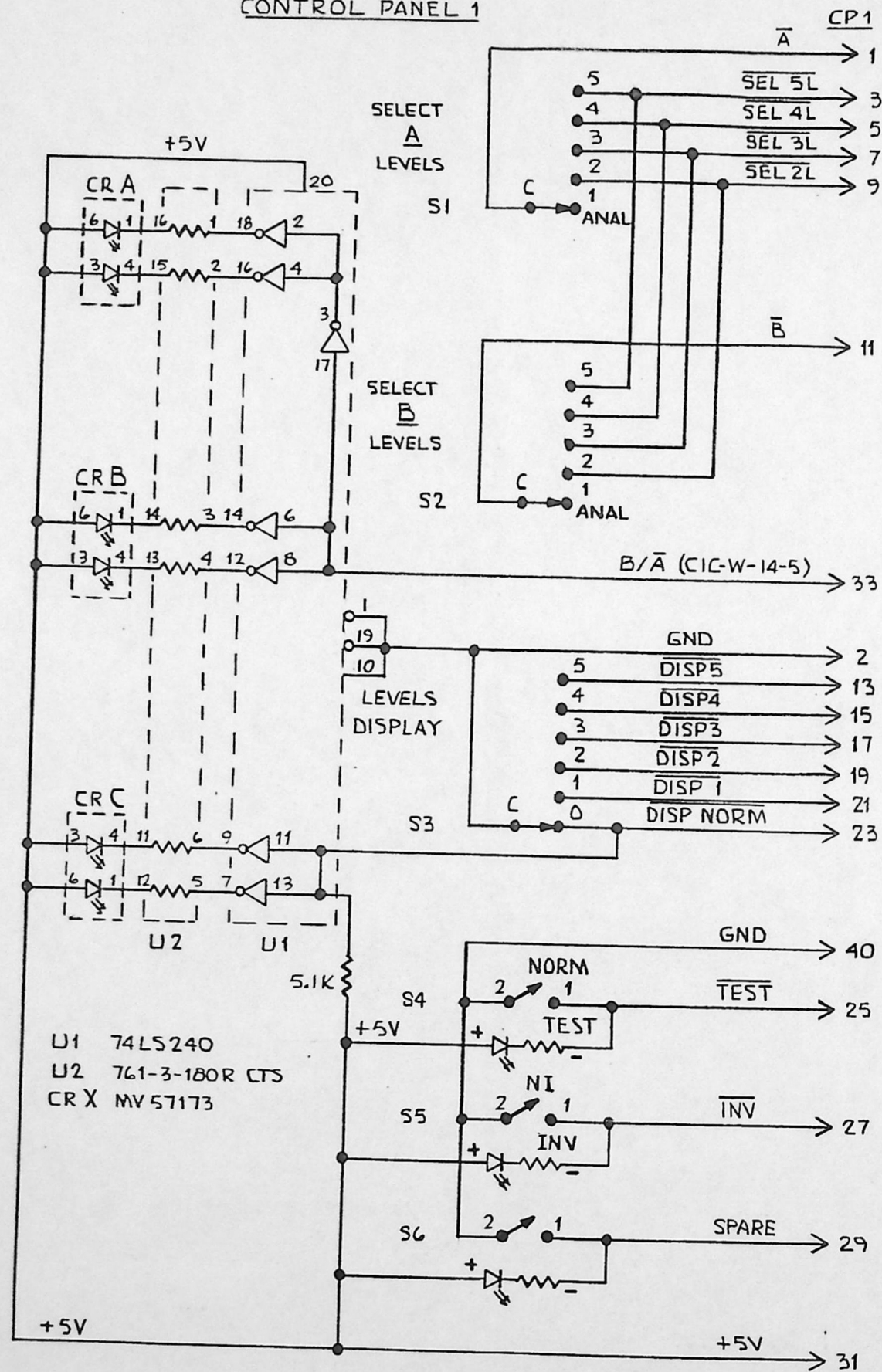


ALL RESISTORS ARE 1/8 W
 K1, K2, K3 ARE AROMAT® NF4-5V
 BNC'S ARE AMPHENOL 31-10

COMPUTER IMAGE

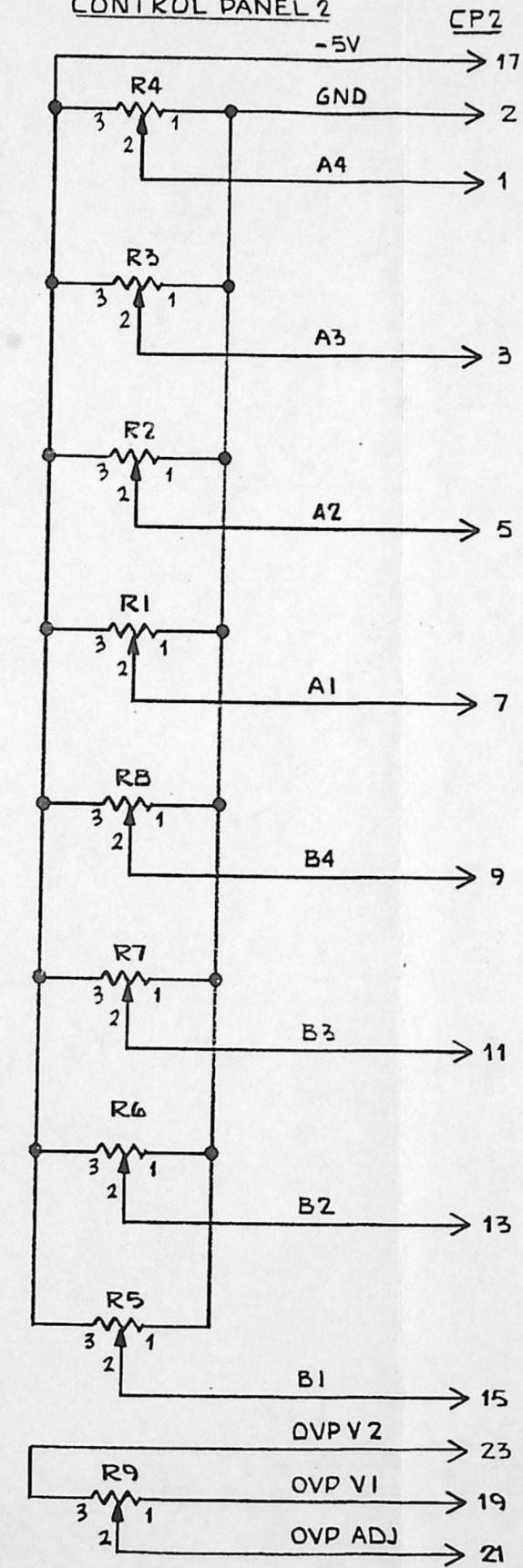
SCALE	REVISIONS	BY	DATE
DATE 1-8-82			
DRN GSH CKD			
APVD			
TITLE X-Y SCOPE SWITCHING Box	NO WCIC-100		

CONTROL PANEL 1



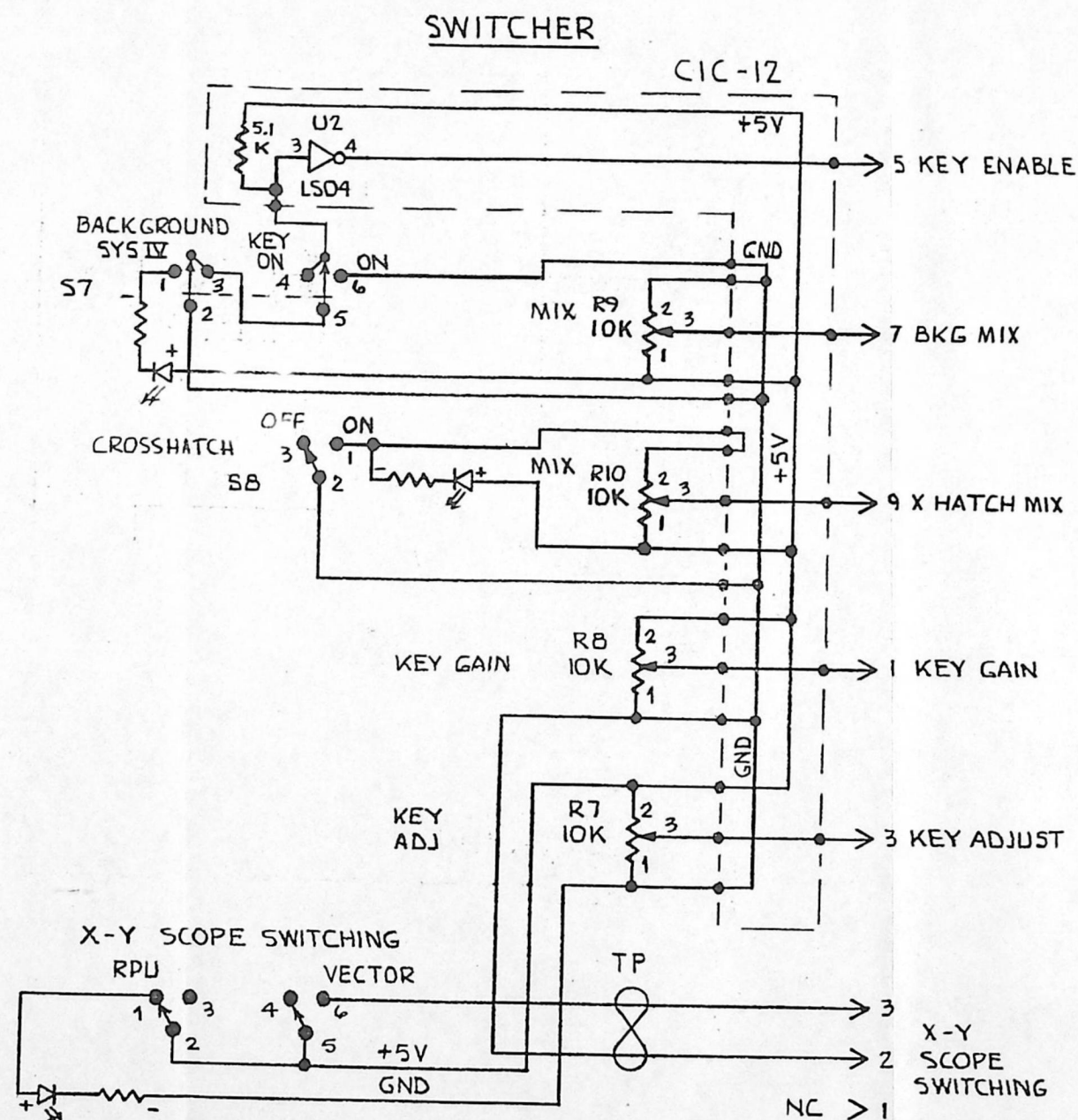
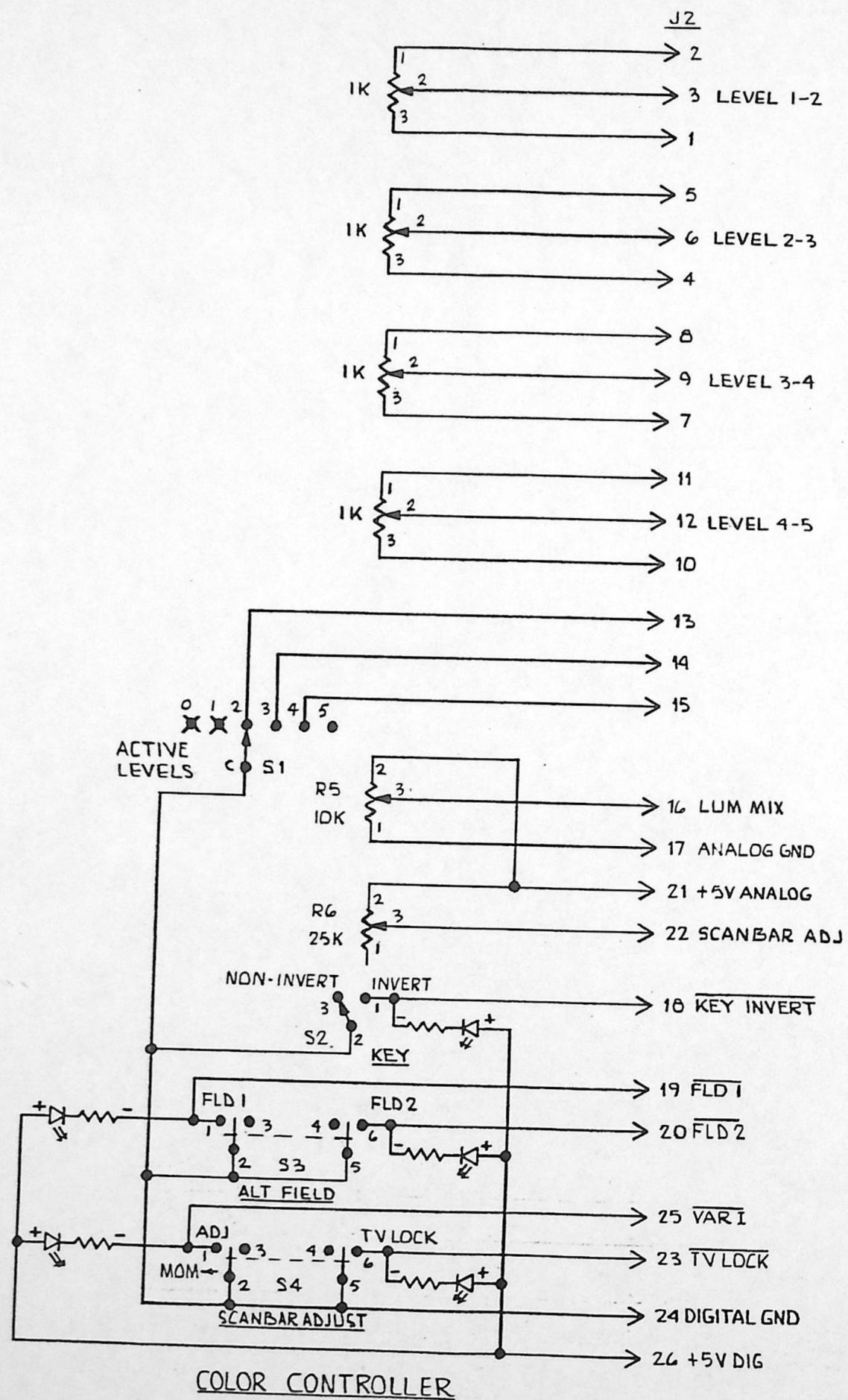
R1-R9 421-SL-10K
DUNCAN

CONTROL PANEL 2



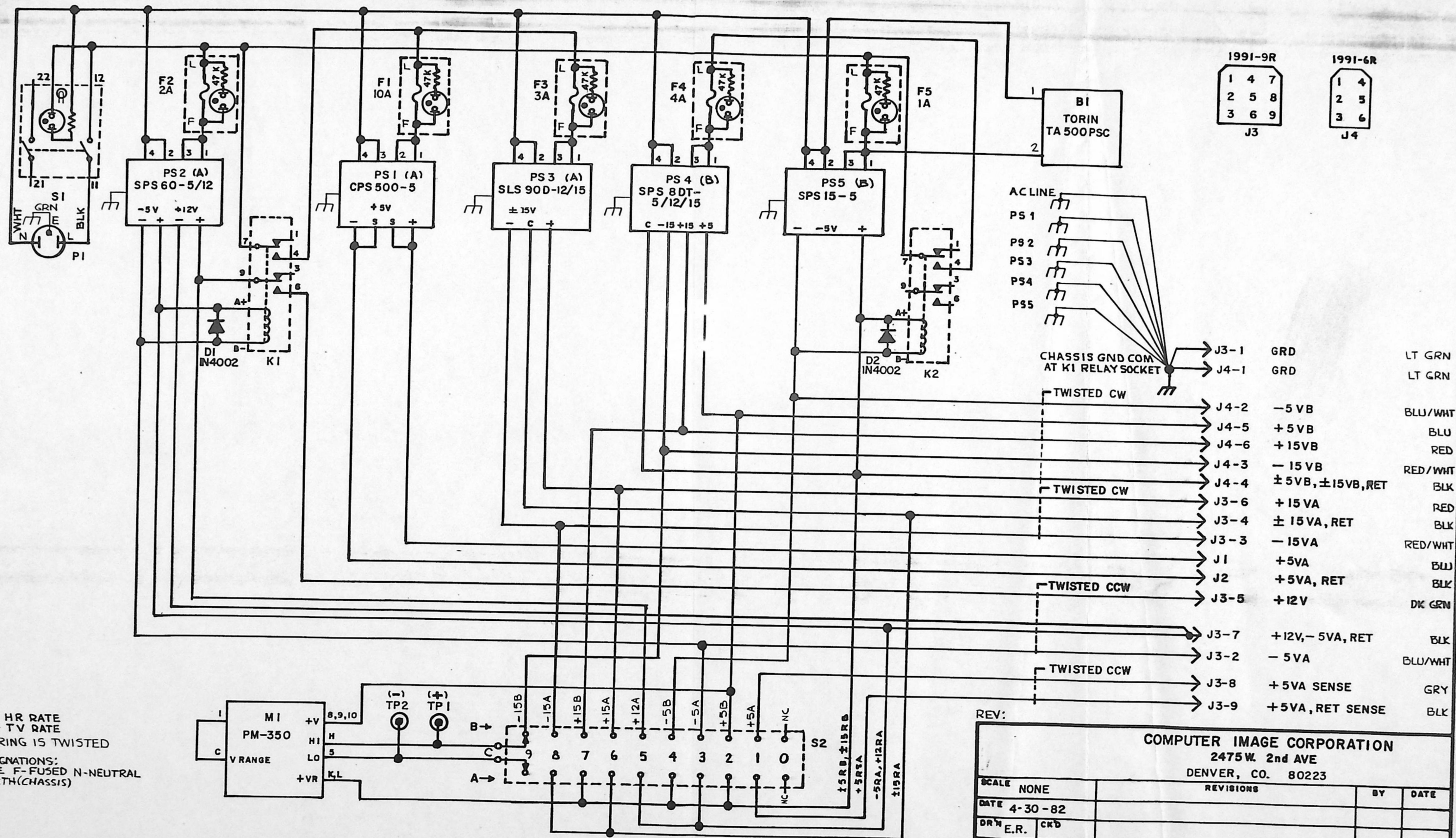
REV: A,

COMPUTER IMAGE CORP
CONTROL PANEL 1 & 2
MONITOR VIDEO PROCESSOR
WCIC-103



REV:

COMPUTER IMAGE CORP
VIDEO SWITCHER/COLORIZER
CONTROL PANEL
WCIC-104

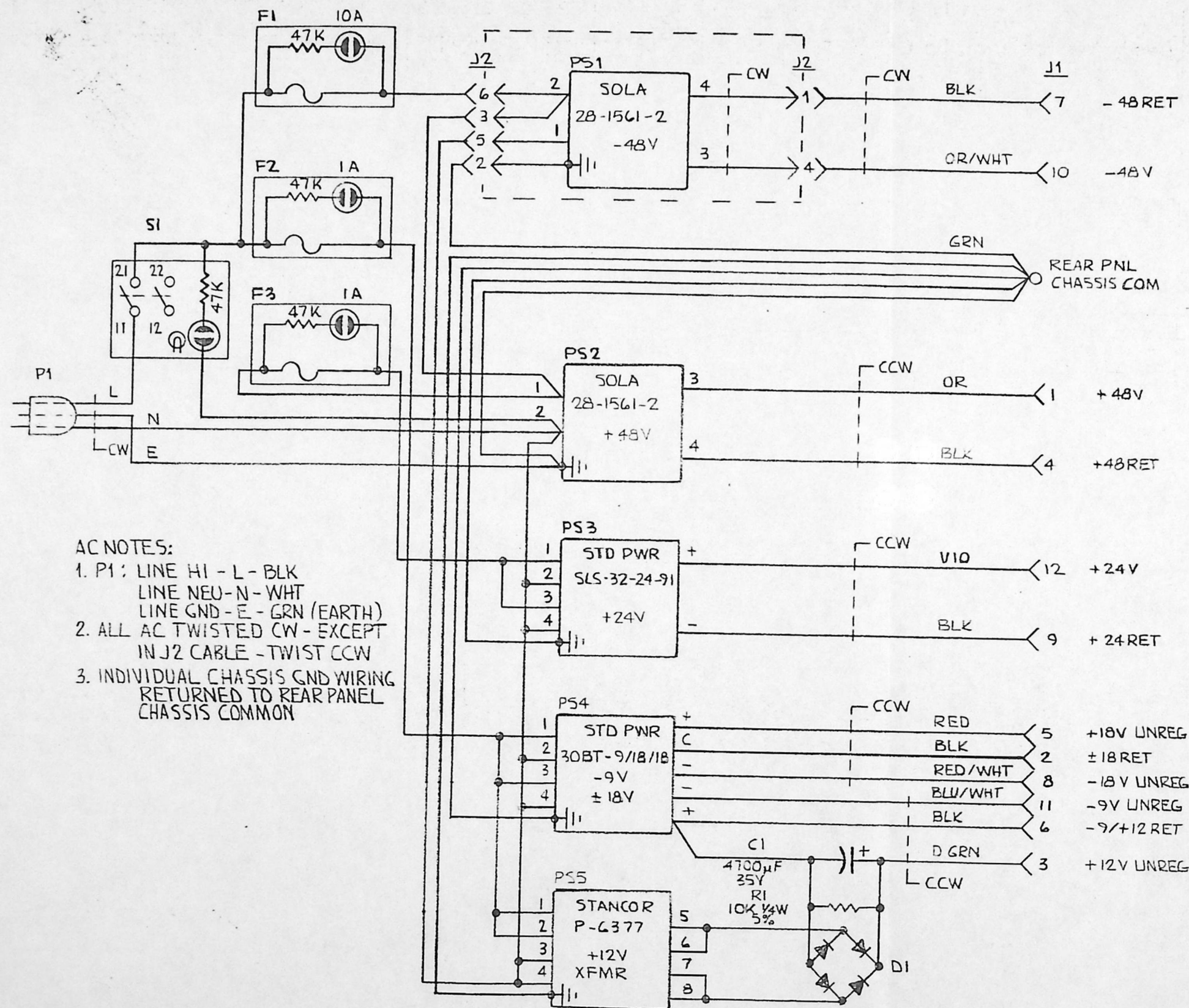


NOTE:

1. APS - HR RATE
2. SPS - TV RATE
3. AC WIRING IS TWISTED
4. AC DESIGNATIONS:
L - LIVE F - FUSED N - NEUTRAL
E - EARTH (CHASSIS)

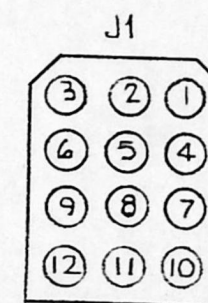
REV:

COMPUTER IMAGE CORPORATION			
2475 W. 2nd AVE			
DENVER, CO. 80223			
SCALE	NONE	REVISIONS	BY
DATE	4-30-82		
DRN	E.R.	CKD	
APVD			
TITLE	MAIN POWER SUPPLY, 110VAC		NO
			WCIC-105-1



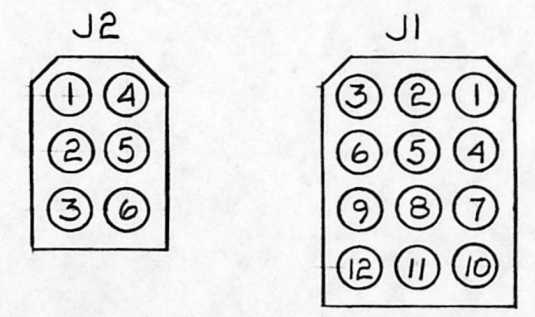
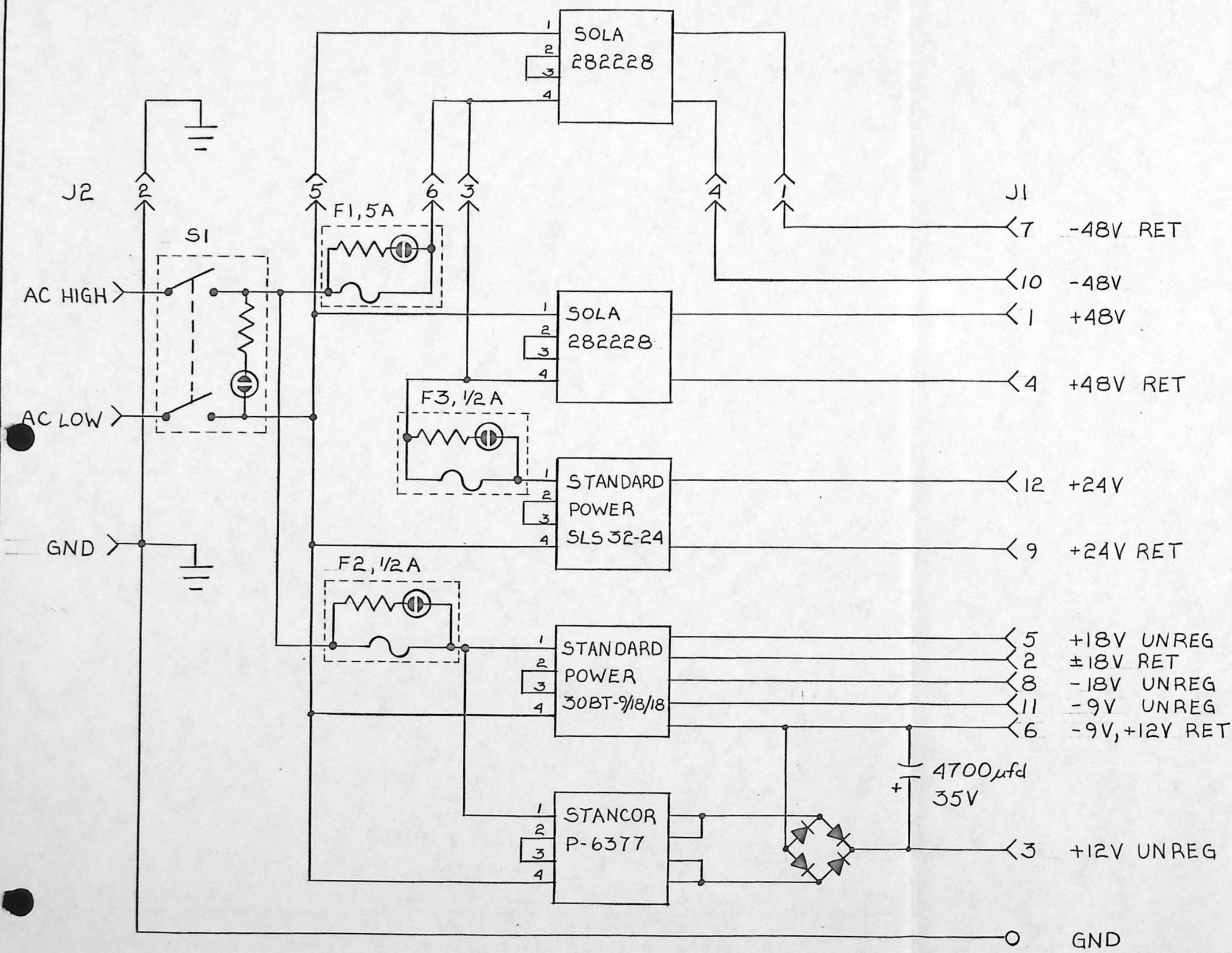
DC NOTES:

- 48VPS WIRING TWISTED CW FOR MAGNETIC
FIELD CANCELLATION
- ALL OTHER DC WIRING TWISTED CCW



EXTERNAL REAR PNL VIEW

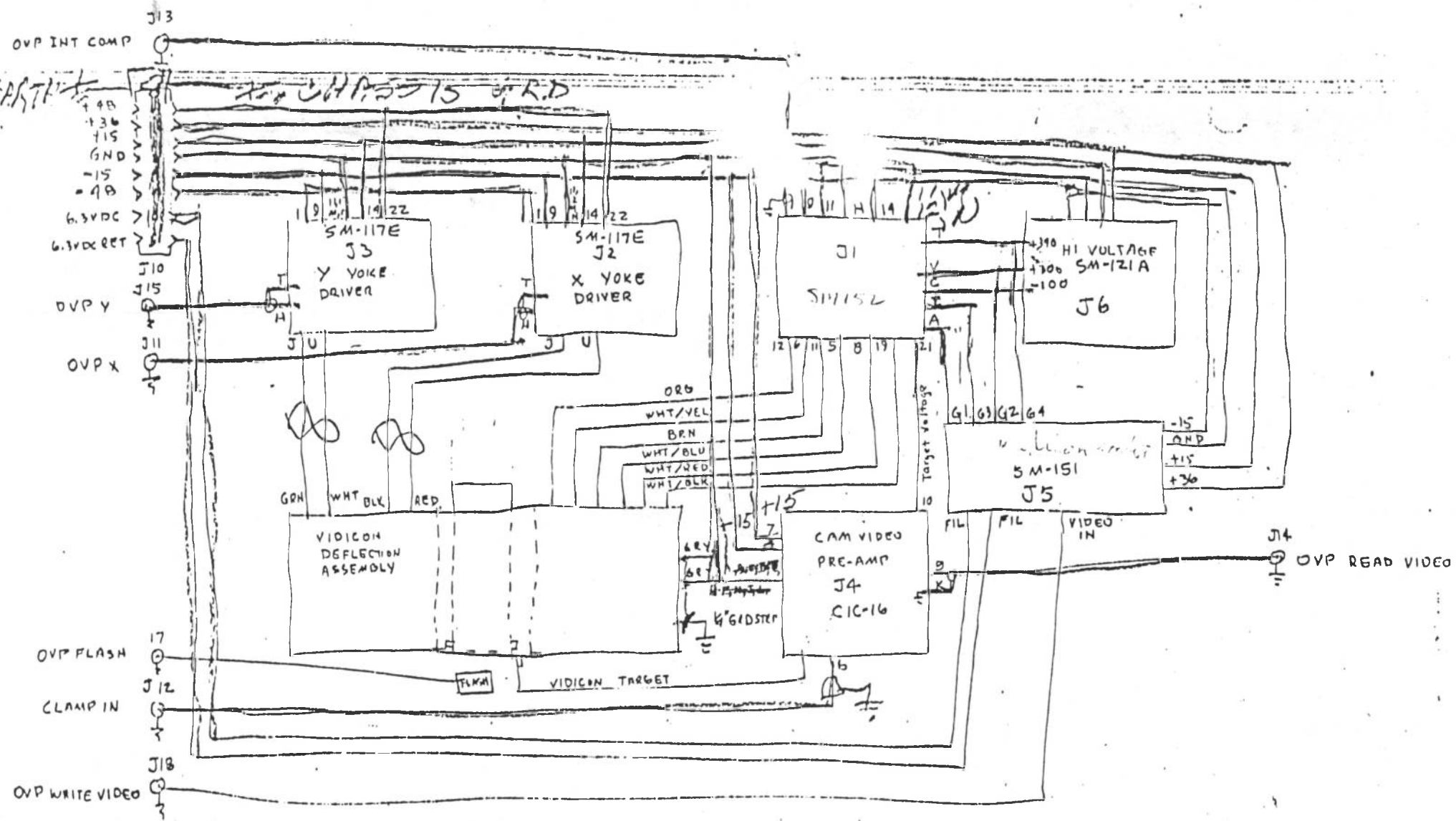
REV SCHEDULE:	COMPUTER IMAGE CORP
ORIG 6/1/83 EVL	SCAN CONVERTER PWR SUPPLY
	110V/60 HZ
	SYSTEM IV
	NCIC-106-1



EXTERNAL PANEL VIEW

COMPUTER IMAGE

SCALE	REVISIONS	BY	DATE
DATE 10-30-81			
DRN GSH	CKD		
APVD			
TITLE SYSTEM IV SCANCONVERTER POWER SUPPLY 220V/50Hz		NO WCIC-106-2	



Microcomputer Power, Inc.

2272 Calle de Luna, Santa Clara, CA 95050

(408) 988-0265

TWX 910 338-7694



APPLICATION DATA INCLUDING:

1. SCHEMATIC
2. PARTS LIST
3. SPECIFICATION
4. OUTLINE & MOUNTING DRAWING

MODEL

CP148

TRIPLE OUTPUT

SPECIFICATIONS:

AC INPUT: 115/230VAC $\pm 10\%$

47-63Hz

DC OUTPUT: *

VOLTAGE	CURRENT (AMPS)
5	6.0
+24	1.8/3.5PK
-24	1.8/3.5PK

*MAX. CONT. OUTPUT POWER: 75 WATTS

LINE REGULATION: $\pm 0.05\%$ FOR A 10%
LINE CHANGE

LOAD REGULATION: $\pm 0.05\%$ FOR A 50%
LOAD CHANGE

OUTPUT RIPPLE: 3mV PK-PK MAX.

TRANSIENT RESPONSE: 30 μ SECONDS
FOR A 50% LOAD CHANGE

OVERLOAD AND SHORT CIRCUIT PROTECTION:
AUTOMATIC CURRENT LIMIT/
FOLDBACK

OVERVOLTAGE PROTECTION: SET AT
6.2 ± 4 VDC ON +5V ONLY

STABILITY: $\pm 0.3\%$ FOR 24HRS AFTER WARM-UP

INPUT FUSING: RECOMMENDED, FUSE AT

4A FOR 115VAC, 2A FOR 230VAC

TEMPERATURE COEFFICIENT: $\pm 0.03\%/^{\circ}\text{C}$ MAX.

COOLING: UNITS ARE FULL RATED TO 50 $^{\circ}\text{C}$
IN FREE AIR, MUST BE FAN
COOLED WHEN MOUNTED IN CON-
FINED AREA

TEMPERATURE RATING:

0-50 $^{\circ}\text{C}$ - 100%

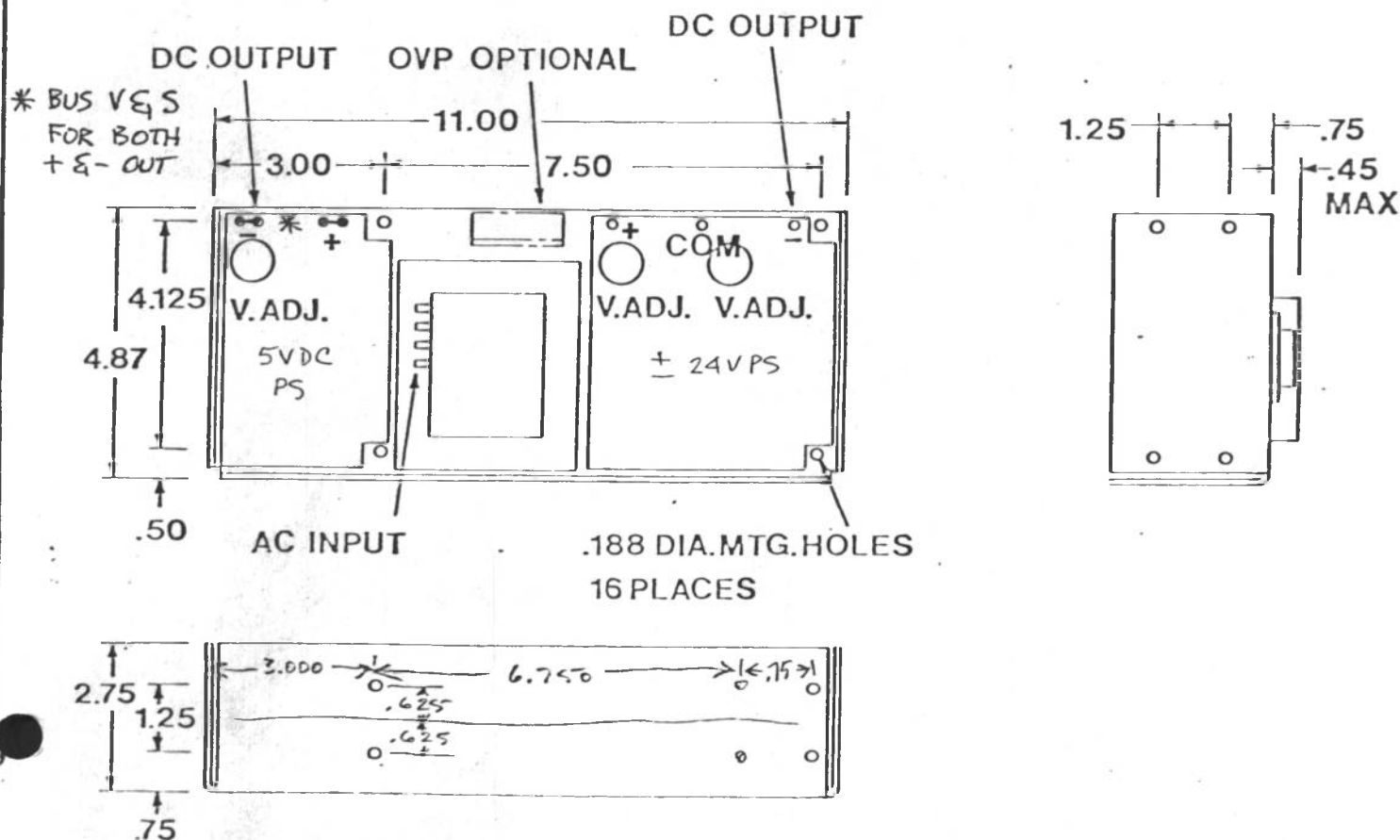
60 $^{\circ}\text{C}$ - 60%

70 $^{\circ}\text{C}$ - 40%

EFFICIENCY: COMBINED EFFICIENCY APPROX.
55% @ 115VAC FULL LOAD ON ALL
OUTPUTS

CONSTRUCTION: ALL ALUMINUM CHASSIS

WEIGHT: 8LBS (3.6KG)



6.0 POWER - SIGNAL PIN ASSIGNMENTS

6.1 Power Connections

BELDEN 8459 (25 COND CABLE)
IPCEA COLOR CODE (CHART 2E-2R)

The power pin assignments for all Drive configurations are shown in Table 6.1-1. Additional power connections for Drives with control and Codec Boards are shown in Table 6.1-2.

Power Supply Pin Assignments

PIN#	6PIN	16PIN	Pin #	Signal	From	Comments
			1	M.N.C.	N.A.	Keying Plug
1	RED/BLK	RED	(A) 2	V24+	Power Supply	+24VDC
4	ORG/BLK	ORG	(B) 3	V24-	Power Supply	-24VDC
5	KEY	KEY	4	M.N.C.	N.A.	Keying Plug
		WHT/BLK/RED	(D) 5	SCOM	Power Supply	Servo Common
2	BLU/BLK	BLU	(C) 6	V5+	Power Supply	+5VDC
3	BLK	WHT/BLK	(D) 7	LCOM	Power Supply	Logic Common
		GRN/BLK	(E) 8	CCOM	Drive	Chassis Common
			9	M.N.C.	N.A.	
		RED/WHT	(A) 10	V24+	Power Supply	+24VDC
		ORG/WHT	(B) 11	V24-	Power Supply	-24VDC
		KEY	12	M.N.C.	N.A.	Keying Plug
		RD/BLK/WHT	(D) 13	SCOM	Power Supply	Servo Common
		BLU/WHT	(C) 14	V5+	Power Supply	+5VDC
6	WHT	BLK/WHT	(D) 15	LCOM	Power Supply	Logic Common
		GRN/BLK/WHT	(E) 16	CCOM	Drive	Chassis Common

TABLE 6.1-1



NOTES: 1. Servo, Logic, and Chassis Common are to be tied together and to ground at one point in power supply.

2. Chassis Common is the physical case of the Drive, Servo Common returns the ± 24 VDC currents and Logic Common returns +5VDC.

3. Mating Connector Part Numbers:

AMP Part Number 2-86256-2, connector (1 each)
AMP Part Number 86016-4, contacts (16 each)
AMP Part Number 86286-1, key plugs (3 each)

or

Cannon Part Number 121-7326-10843, connector (1 each)
Cannon Part Number 11-0238-0091, contacts (13 each)
Cannon Part Number 225-7301-003, key plugs (3 each)

M.N.C. Make no external connections.

1	KEY		9
2	+24	+24	10
3	-24	-24	11
4	KEY	KEY	12
5	SCOM	SCOM	13
6	+5	+5	14
7	LCOM	LCOM	15
8	CCOM	CCOM	16

FRONT
VIEW



DATA ELECTRONICS, INC.

SIZE

DOCUMENT NO.

SCALE

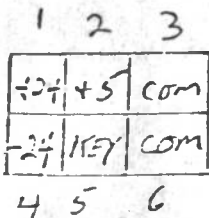
A

301,056

SHEET 36 OF 41

BELDEN 8459 (25 COND CABLE)
IPCEA COLOR CODE (CHART 2&2R)

BELDEN
CATALOG # 876-RM
REF-PG 6



REAR VIEW

PIN #	SIGNAL	FROM	COMMENTS
RED/BLK ① 1	V24+	POWER SUPPLY	+24VDC
BLU/BLK ② 2	V5+	POWER SUPPLY	+5VDC
BLK ③ 3	LCOM	POWER SUPPLY	LOGIC COMMON ←
ORG/BLK ④ 4	V24-	POWER SUPPLY	-24VDC
5	M.N.C.	— N.A.	KEY
WHT ⑥ 6	LCOM	POWER SUPPLY	LOGIC COMMON ←

TABLE 6.1-2

NOTES:

1. M.N.C. Make no external connection.

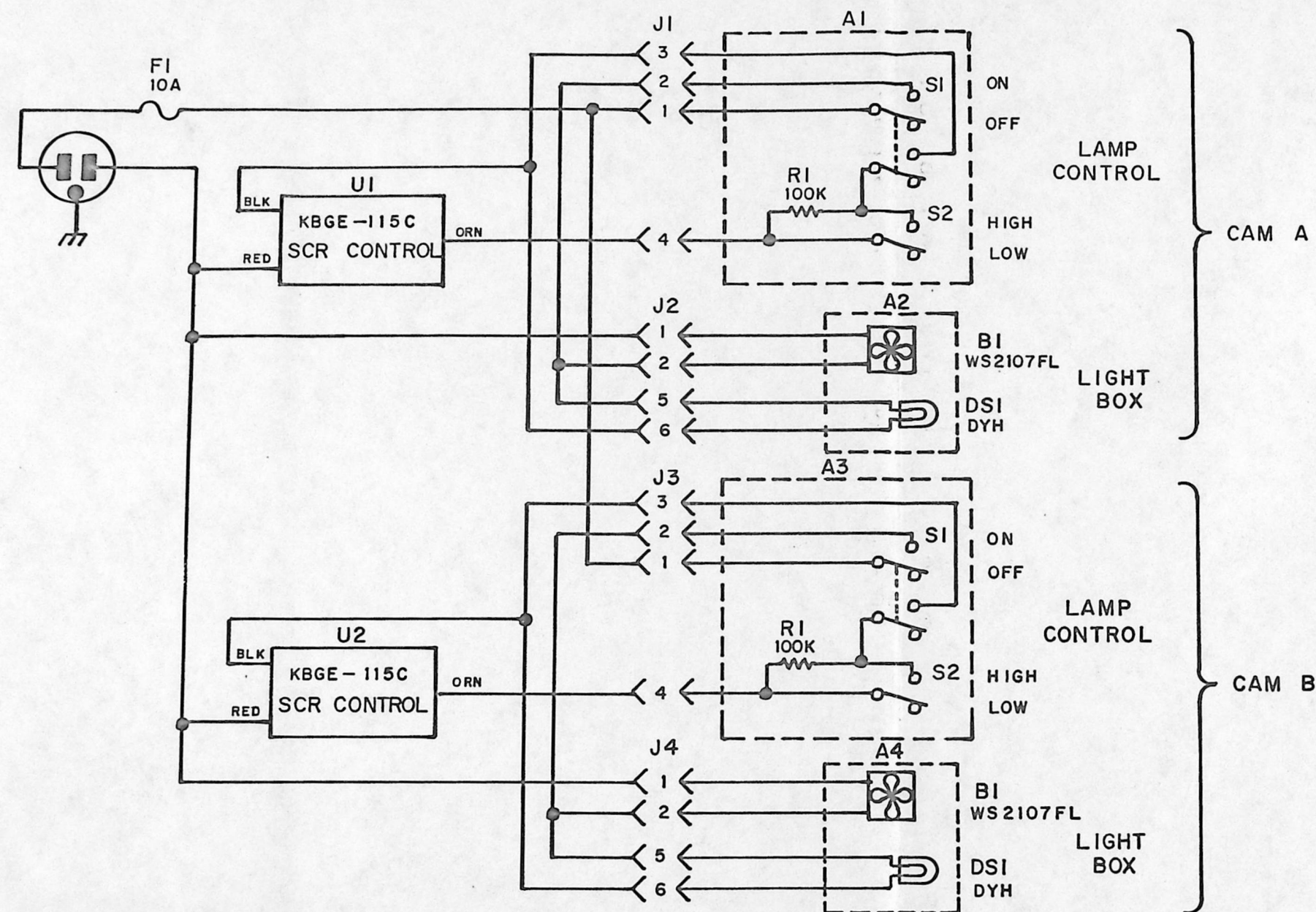
② Logic Common to be tied to corresponding signal at one place (where other commons are tied together) in power supply.

3. Mating connector Part Numbers:

Cannon Part Number: 121-7326-702, connector (1 each)

Cannon Part Number: 11-0238-0091, contacts (5 each)

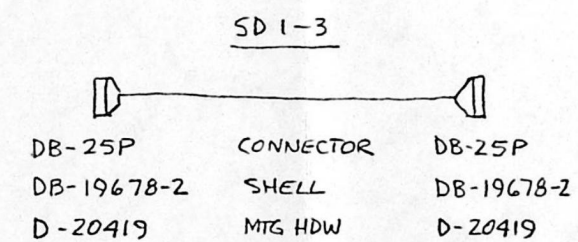
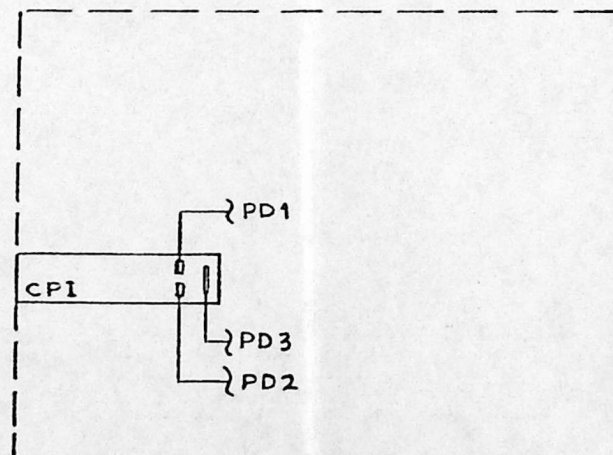
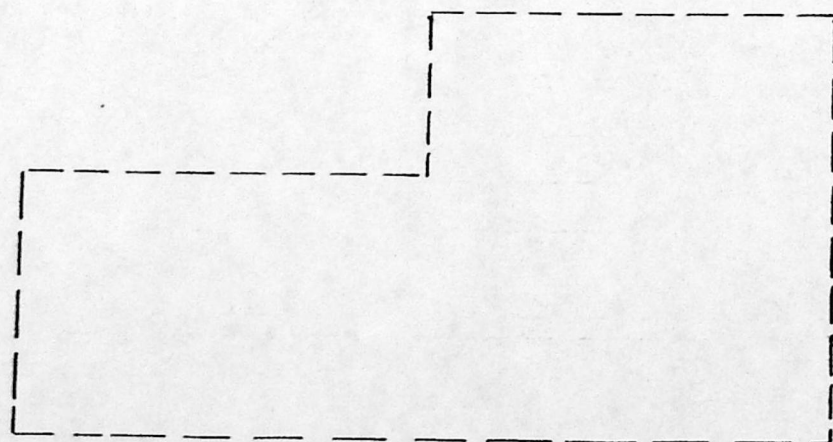
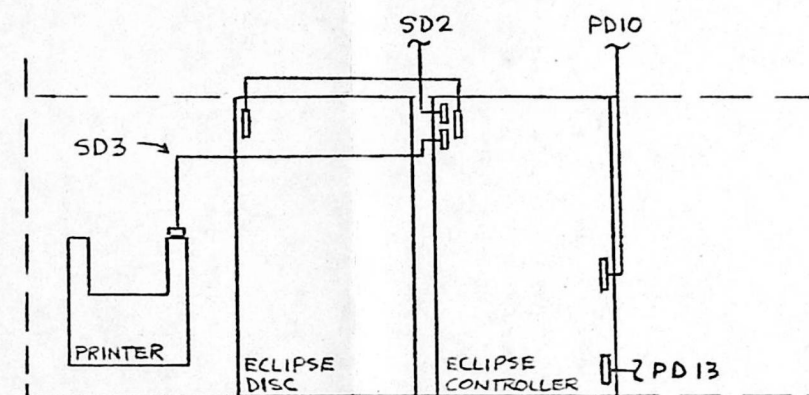
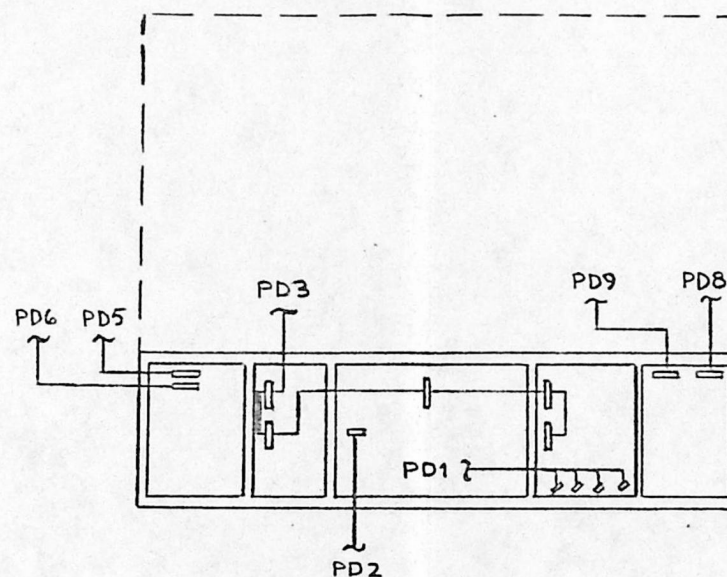
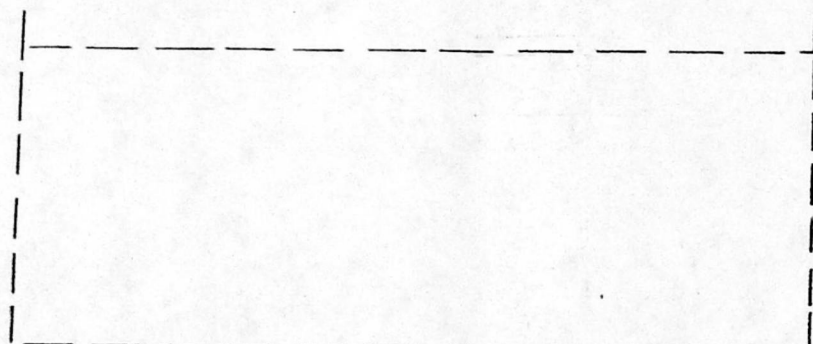
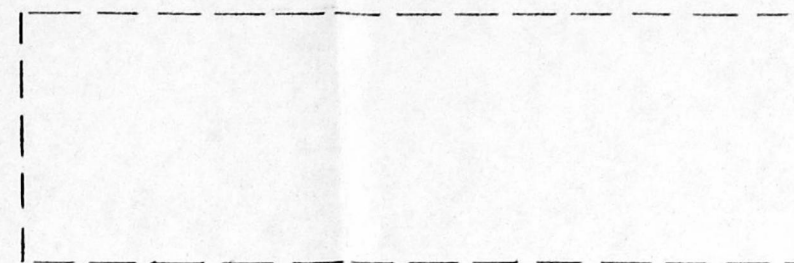
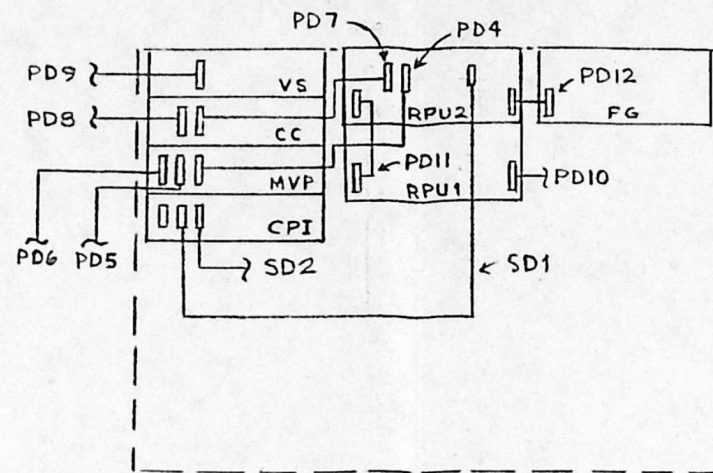
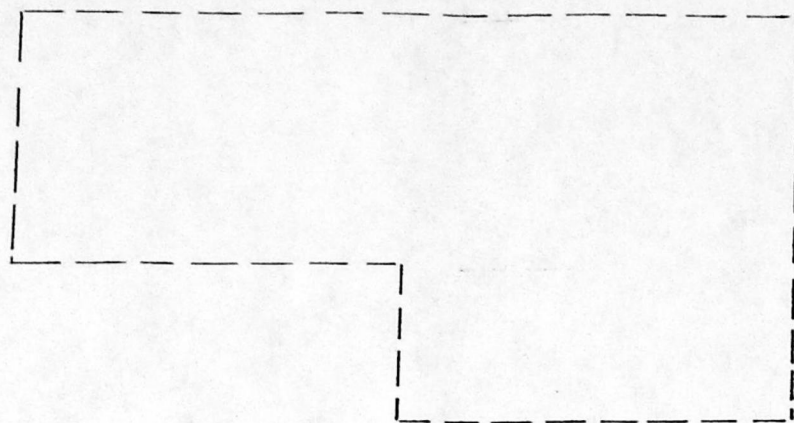
Cannon Part Number: 225-7301-003, key (1 each)



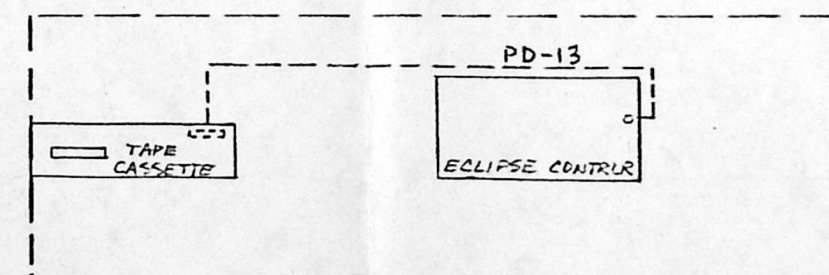
MATERIAL LIST FOR 220 VAC

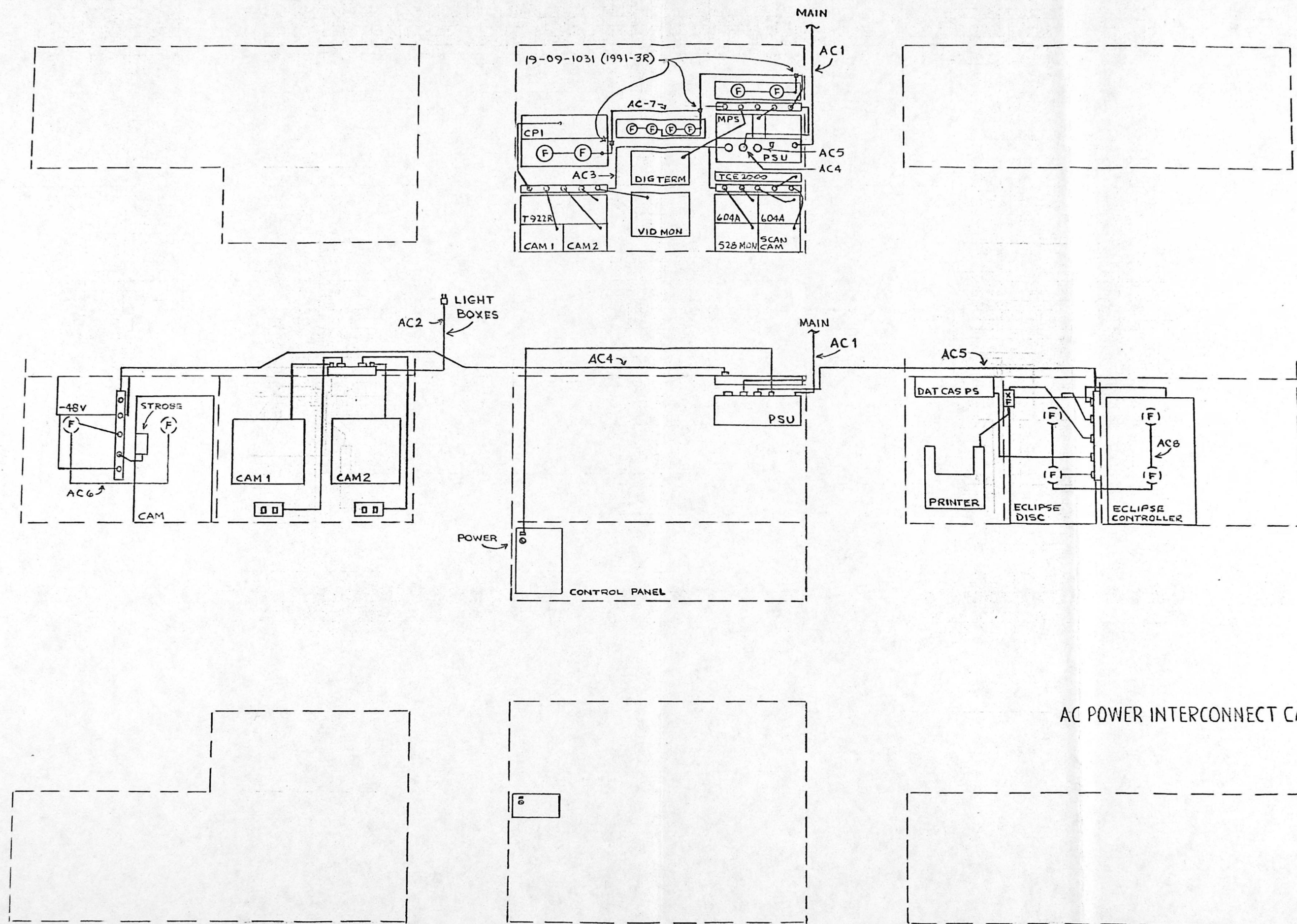
F1 IS 5A
 U1 & U2 ARE KBGE-215C
 BI OF A2 & A4 IS A WS2107FL-1010
 DSI OF A2 & A4 IS A DYJ
 RI OF A1 & A3 IS 200K

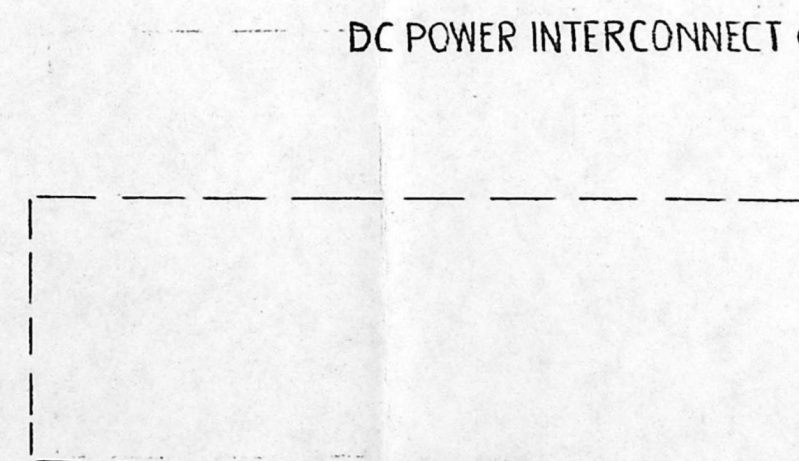
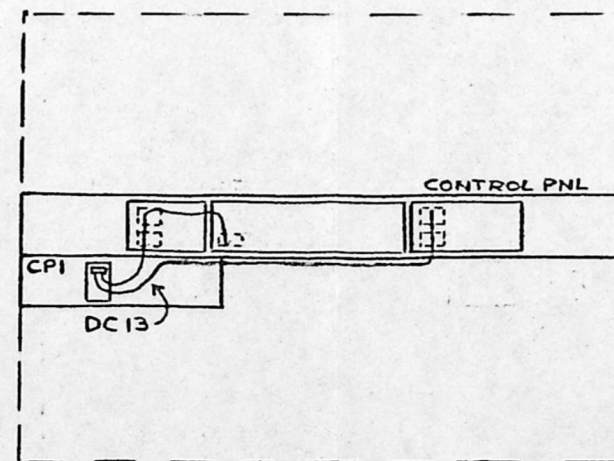
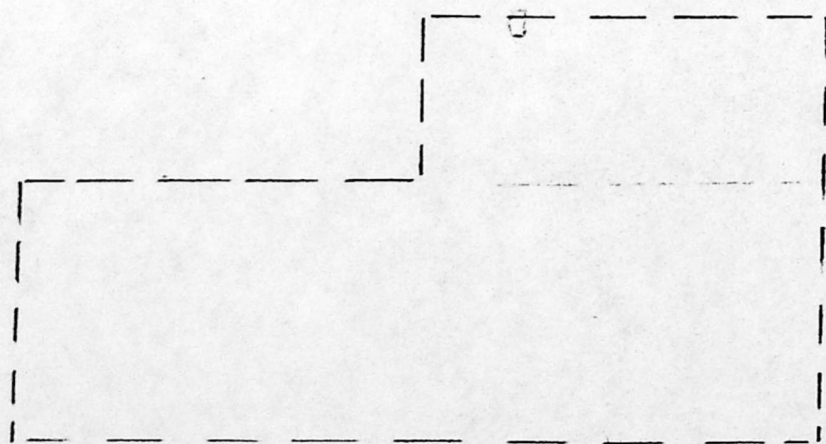
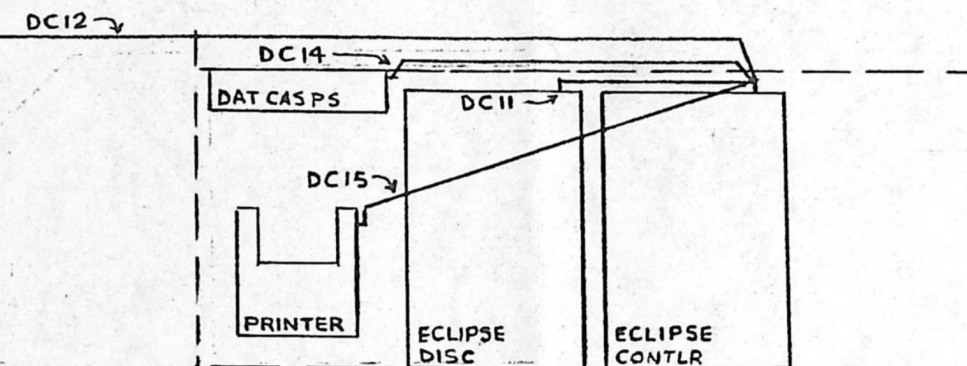
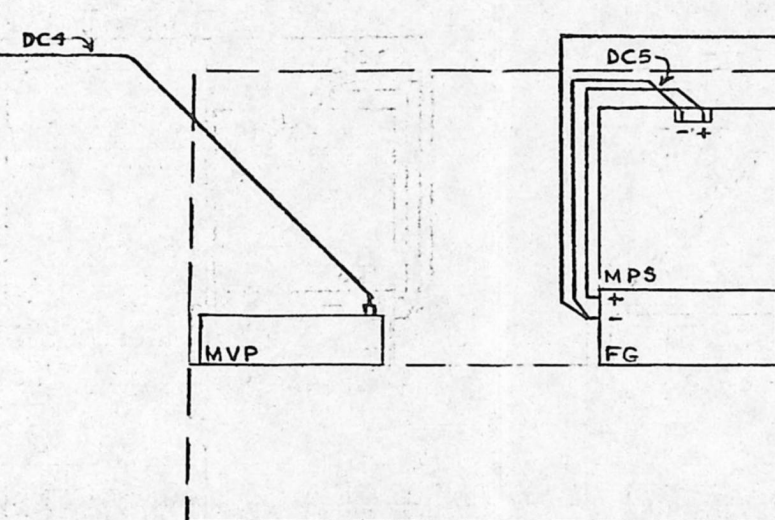
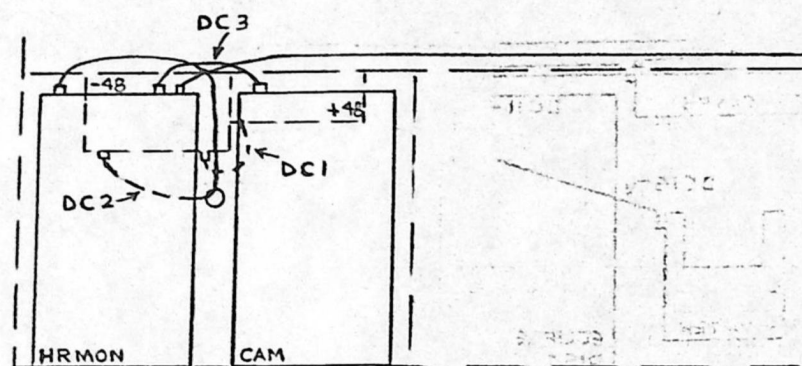
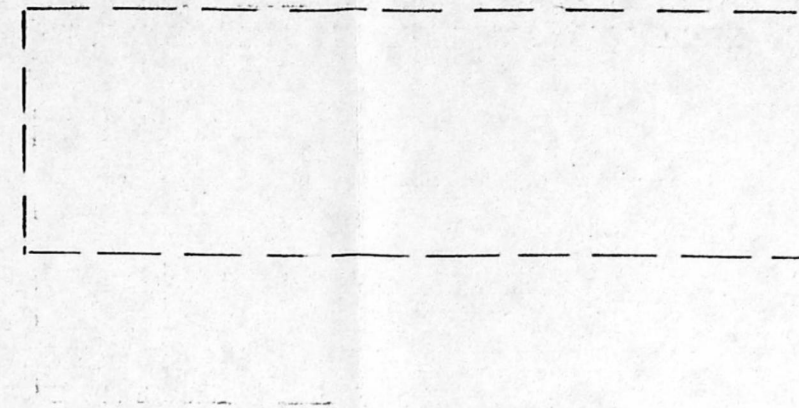
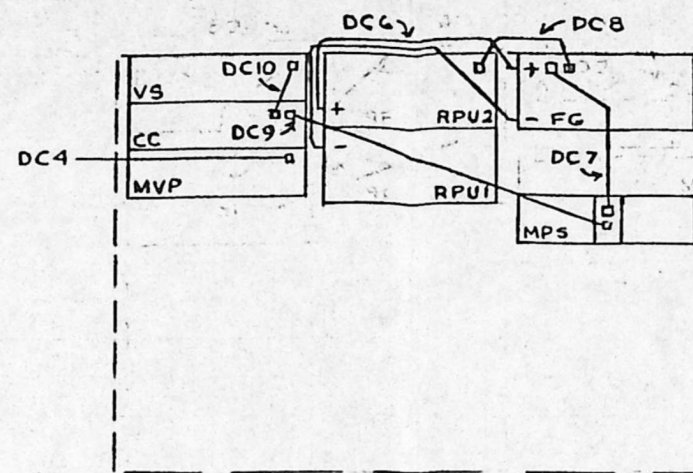
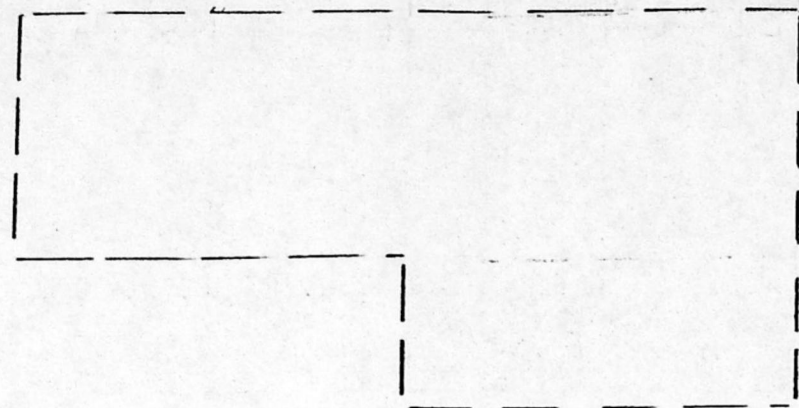
COMPUTER IMAGE CORPORATION 2475W. 2nd AVE DENVER, CO. 80223			
SCALE NONE	REVISIONS	BY	DATE
DATE 4-26-82			
DRN E.R.	CRD		
APVD 4-20-82 G.H.			
TITLE LIGHT BOX CONTROL		NO WCIC-110	



SER/PAR DIGITAL INTERCONNECT CABLING







DC POWER INTERCONNECT CABLING

SYSTEM NUMBER: 026-3 MEXICO

FCN DESCRIPTION

CIC-W-20 Int. Comp for Mexico
needs AD535KH from old board
Install at R7

CMX
\$30.00

EDITING MANUAL

"Computerized Videotape Editing"

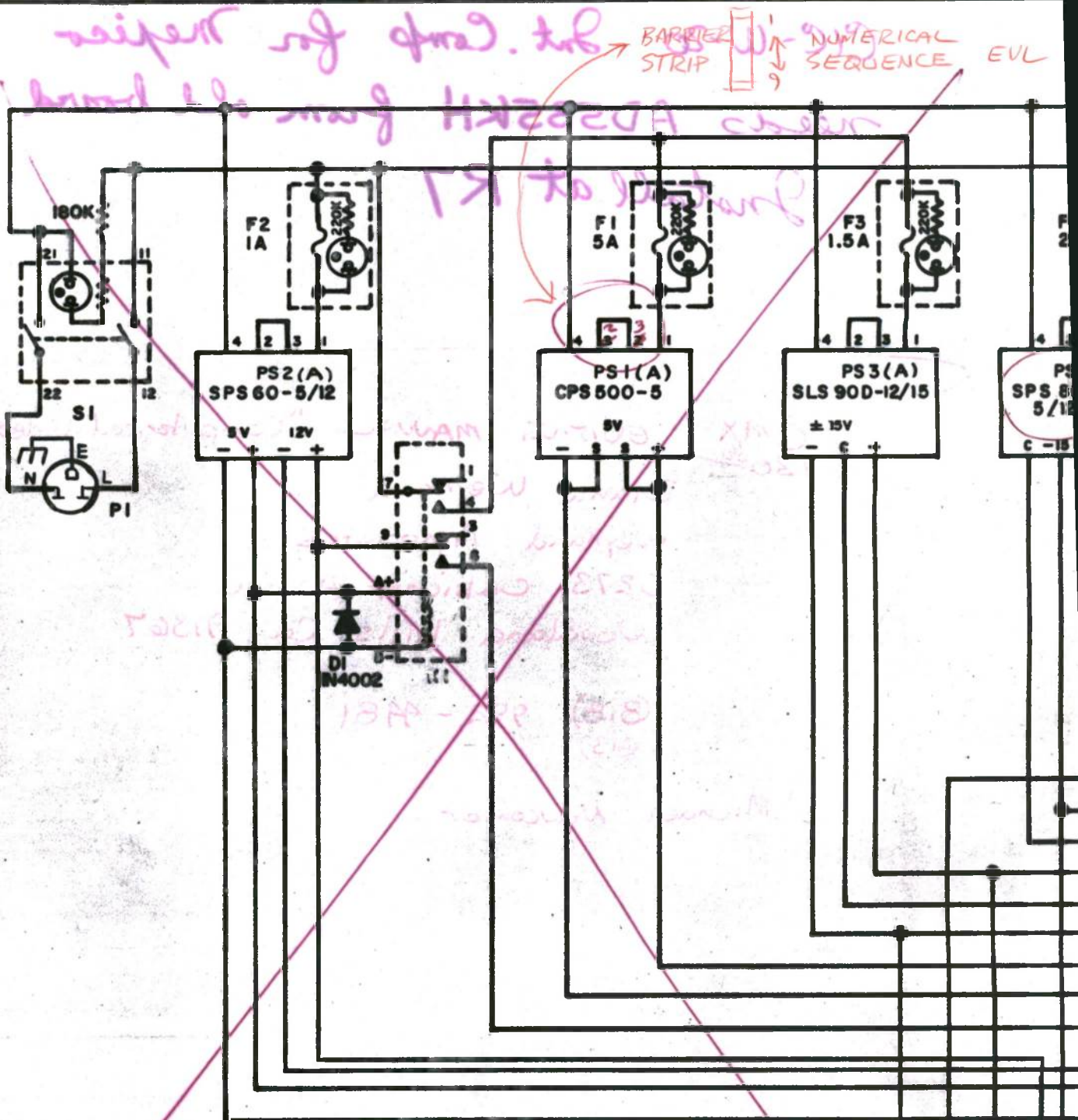
Diana Weynand
Weynand Associates
6273 Callicott Avenue
Woodland Hills, Ca 91367

(818) 992-4481
(213)

Michael Newcomer

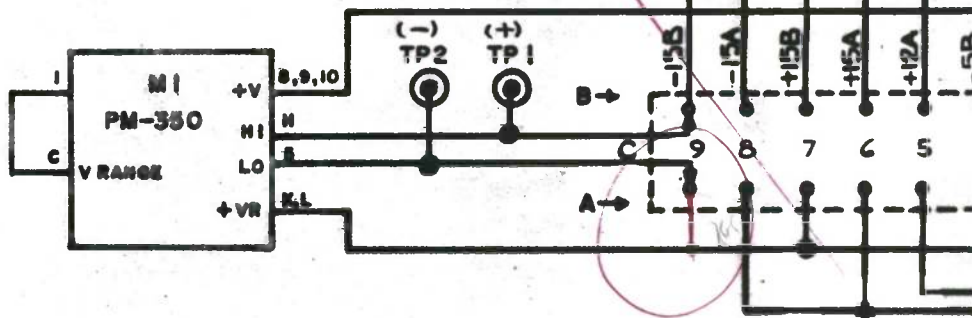
- 105
- 45 • 106
- 46 • 107
- 47 • 108
- 48 • 109
- 49 • 110
- 50 • 111
- 51 • 112
- 52 • 113
- 53 • 114
- 54 • 115
- 55 • 116
- 56 • 117
- 57 • 118
- 58 • 119
- 59 • 120
- 60 • 121
- 61 • 122





NOTE:

1. A PS - HR RATE
2. B PS - TYRATE
3. AC DESIGNATIONS:
L - LIVE F - FUSED N - NEUTRAL
E - EARTH(CHASSIS)
4. AC WIRING IS TWISTED



COMPUTER IMAGE CORPORATION

SYSTEM 4 FIELD CHANGE NOTICE

FCN # 05 RELATED ECN # 71

JUNE 2, 1983

RE: INCREASED GAIN AND IMPROVED COLOR LEVEL SEPERATION OF THE COLOR CONTROLLER.

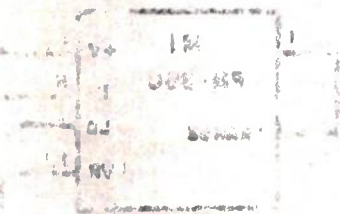
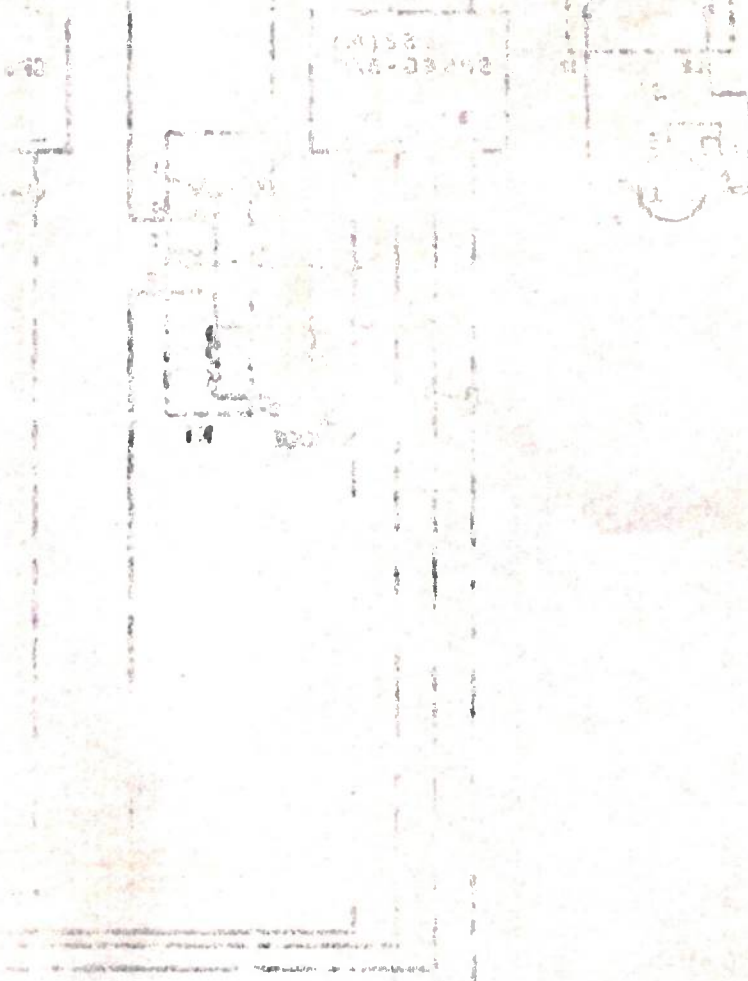
MATERIALS REQUIRED FOR THIS FCN (SUPPLIED):

300 OHM 1/8 WATT RESISTOR

STEP 1 LOCATE AND REMOVE THE INPUT AMP CVS-134-A CARD (COLOR CONTROLLER SLOT #10).

STEP 2 LOCATE AND REMOVE R17, 470 OHM RESISTOR. REPLACE WITH THE 300 OHM RESISTOR. REINSTALL THE CARD IN THE NEST.

THAT COMPLETES THIS FCN!



NOTE:
1. DATE 06-29-83
2. BY 370187-218
3. FOR DEPARTMENT OF THE ARMY
4. FILE IN 370187-218
5. E-1000-370187-218
6. WIRING DIAGRAM

SYSTEM 4 REVISION HISTORY

SYSTEM NUMBER: 026-3

DATE SHIPPED: _____

SOFTWARE HISTORY

REV.	AS SHIPPED	UPDATED TO		UPDATED TO		UPDATED TO		UPDATED TO		UPDATED TO		UPDATED TO		UPDATED TO	
		REV.	DATE	REV.	DATE	REV.	DATE	REV.	DATE	REV.	DATE	REV.	DATE	REV.	DATE
	2.0	2.4	OCT 82	2.6	3-7-83										

FIRMWARE HISTORY

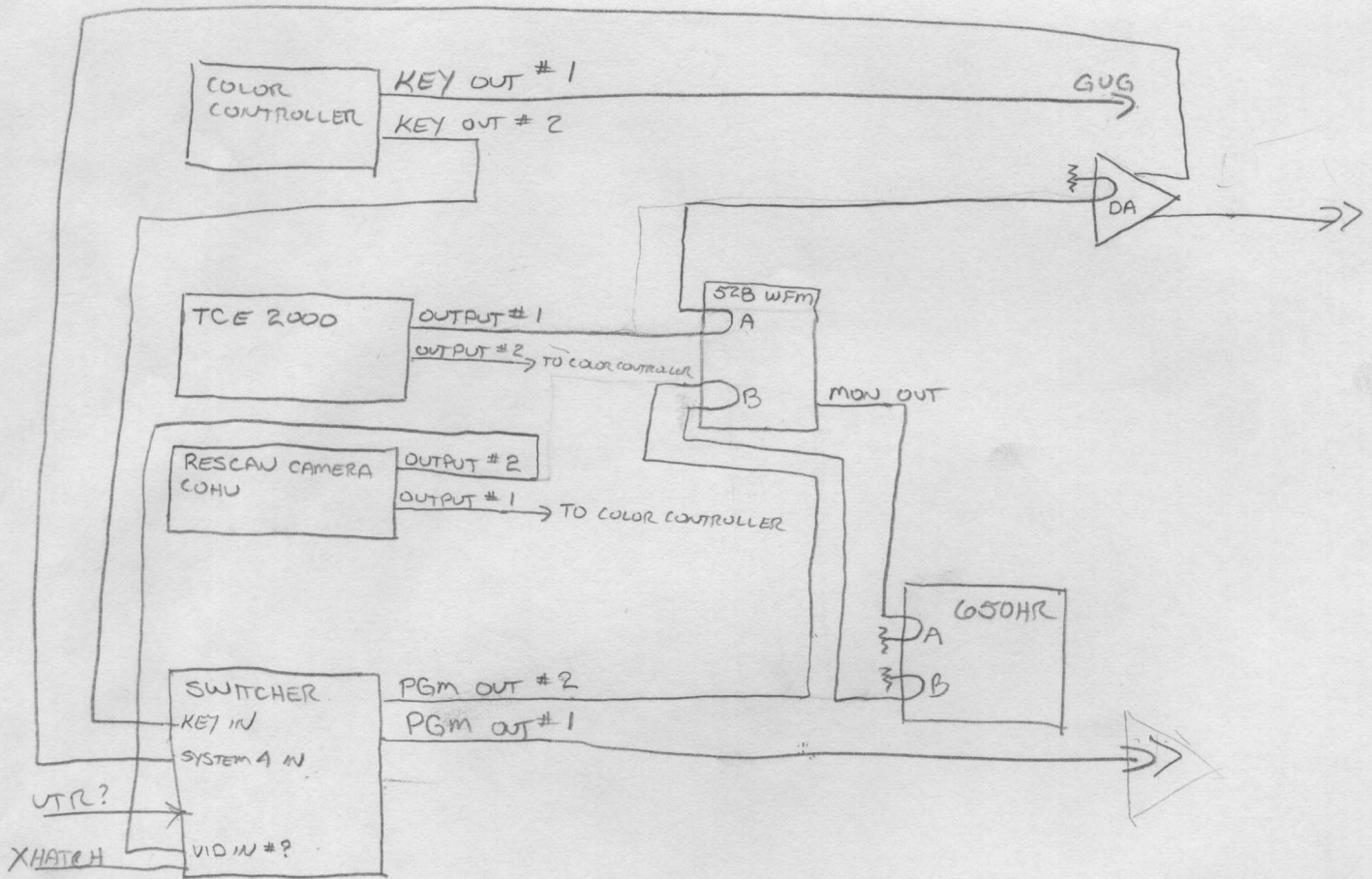
[illegible]

026-3

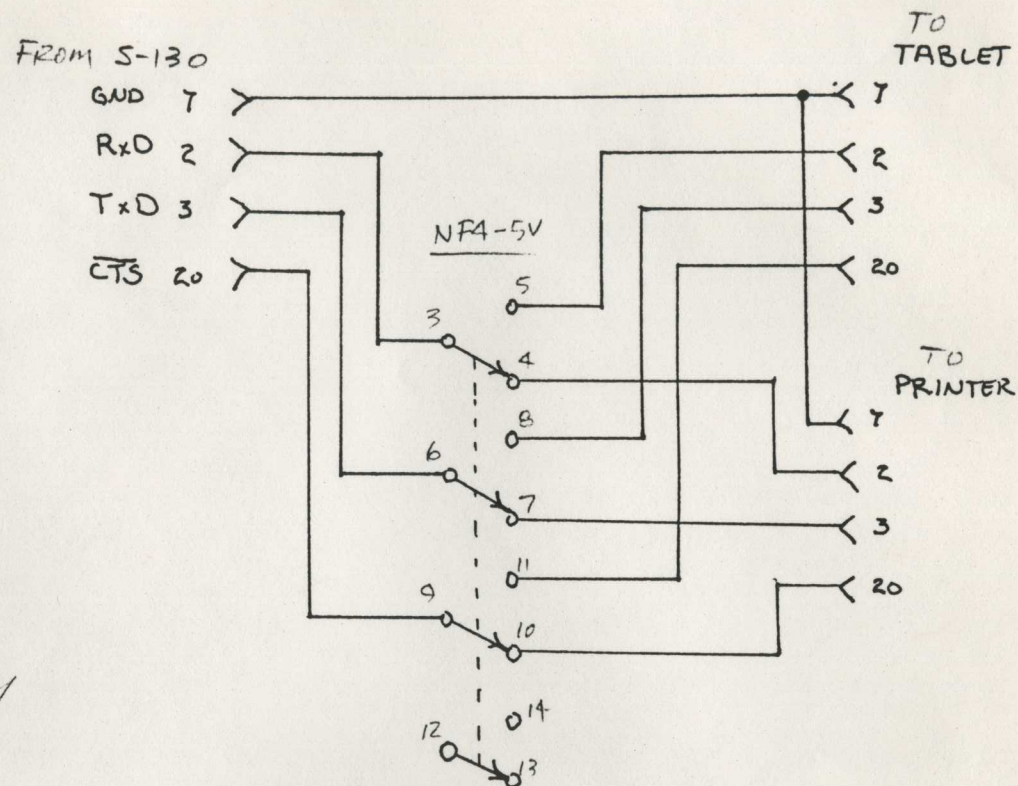
HARDWARE HISTORY

DRAWING NUMBER	REV. AS SHIPPED	UPDATED TO REV. DATE	UPDATED TO REV. DATE	UPDATED TO REV. DATE	UPDATED TO REV. DATE	UPDATED TO REV. DATE	UPDATED TO REV. DATE	UPDATED TO REV. DATE	UPDATED TO REV. DATE	UPDATED TO REV. DATE	UPDATED TO REV. DATE	UPDATED TO REV. DATE	UPDATED TO REV. DATE	UPDATED TO REV. DATE	UPDATED TO REV. DATE	UPDATED TO REV. DATE
CIC-1-1	CIC-1															
CIC-1-2	-2															
CIC-1-3	-3															
CIC-1-5	-5															
CIC-2	-2															
CIC-3	-3															
CIC-4	-4A															
CIC-5	-5															
CIC-6	-6A															
CIC-7-1	-7-1															
CIC-7-3	-7-3A															
CIC-7-4	-7-4															
CIC-7-5	-7-5															
CIC-9-1	-9-1															
CIC-9-2	-9-2															
CIC-10	-10															
CIC-11	-11															
CIC-12	-12															
CIC-W-13	-13															
CIC-W-14	-14															
CIC-W-15	-15B															
CIC-16	-16															
CIC-W-17	-17															
CIC-W-18	-18															
CIC-W-19	-19															
CIC-W-20	-20A															
CIC-W-21	-21A															
CIC-W-22	-22															
CIC-W-23	-23															
CIC-W-24	-24															
✓ CIC-W-29																
CIC-W-32	-32															
CIC-W-33	-33B															
✓ CIC-W-3A																
CIC-W-42	-42															
CIC-W-43	-43															
CIC-W-60	-60A															
CIC-W-61	-61A															
CIC-W-62	-62B															
CIC-W-63	-63A															
CIC-W-64	-64A															
CIC-W-65	-65 <i>w/24/6</i>															
CIC-W-66	-66C	D	OCT 82													
CIC-W-67	-67C	D	2/82													
CIC-W-69	-69A															
✓ CIC-W-70	-70B															

[illegible]



NC > 1



WCIC -

include
initialize
@table

Jumpor 25 L-m
Jumpor installed pin 76/18 WSK

updates

tablet - haven't been change ~~for~~ it yet
training - Eduardo international trainer
fine tweaking

mlr - das

profits - technical assistance \$200/day

additional charges -

tubes (2)

fan

tablet

air fair

~~Mount~~ Monthly reports

Profit and Loss

Performance Improvement Contract

take copy of contract

~~they~~ they will be eligible for the contract
now that they have updates

Production from

take everything I can find

150
45

INTRODUCTION

WAVEMAKER is a stand-alone program that lets you create System IV waveforms without knowing details about the structure of waveform files. You enter geometric descriptions of the figures you want to create, and WAVEMAKER puts your data into System IV waveform format.

You can enter geometric descriptions by digitizing figures on the graphics tablet or by typing point and line data into ASCII disk files with a text editor.

You can use WAVEMAKER to create single waveforms, matched pairs of waveforms, and matched triplets of waveforms. Matched pairs of waveforms are for building 2D wireframe figures, streaks (sometimes called "extruders"), and solids of revolution. Matched triplets of waveforms are for building 3D wireframe figures.

INVOKING THE PROGRAM

Exit System IV first if you are in it, then type WAVEMAKER and push the RETURN key. The program begins by typing out a header and prompting you for information about what you intend to do.

SELECTING NUMBER OF DIMENSIONS

The program asks for the number of dimensions you want to use. Choose 1 dimension to create a single waveform. Choose 2 dimensions to create a matched pair of waveforms. Choose 3 dimensions to create a matched triplet of waveforms.

SELECTING SCALING METHOD

The program asks for the scaling method you want to use. You have two choices.

With FULL SIZE scaling, the waveforms are scaled so as to make the figure you describe as large as possible. This scaling is best in terms of resolution.

With FIX ORIGIN scaling, the waveforms are scaled so that the origin (i.e. zero point) that you specify remains fixed relative to the figure. You control the position of the origin. For example, to generate a solid of revolution, you would want to draw the outline of the solid's surface in its proper position relative to the axis of revolution. In this case, the origin should be placed on the axis of revolution.

SELECTING WAVEFORM NAMES

You choose a generic name for your waveform or waveforms. WAVEMAKER automatically adds a ".WF" file extension to the name that you choose. If you are creating more than one waveform, the program also numbers your waveforms.

For example, if you are creating a single waveform and you choose the name DEMO, then your waveform will be named DEMO.WF. If you are creating a pair of waveforms, then your waveforms will be named DEMO1.WF and DEMO2.WF.

USING THE GRAPHICS TABLET

When you trace out a figure on the graphics tablet, the stylus records the position of points in the figure and transmits the coordinates of the points to WAVEMAKER. WAVEMAKER connects some pairs of points with straight line segments, as per your directions. When you connect a sequence of points with lines, you build up a zig-zag line

The stylus works only when it is in proximity of the tablet and when you either press the switch on the stylus barrel or push down on the tip of the stylus. These two actions are equivalent.

You can choose either POINT MODE or STREAM MODE, and you can switch back and forth at any time. In POINT MODE, the stylus records one point each time you press the stylus switch. In STREAM MODE, the stylus records points continuously as long as the stylus switch is depressed and the stylus is in motion.

WAVEMAKER always connects pairs of consecutive points with lines unless you indicate otherwise. When you want to lift up the stylus and draw a line not connected to the previous line, you enter LIFT STYLUS first.

When you are finished, enter STOP and WAVEMAKER will begin to create waveforms using the data you entered.

As the stylus records points, you should hear audible feedback and see messages on the alphanumeric display. The feedback and messages stop if you try to perform an invalid operation.

The numbers that you see on the alphanumeric display count the line segments entered so far. The program is currently limited to 1200 line segments.

HOW TO ENTER DATA USING ASCII DISK FILES

You'll use disk file input mostly for making 3D wireframe figures that can't be drawn on the graphics tablet. In some cases where you could use the tablet, you might find that ASCII input is easier or more precise.

You put a geometric description of the figure you want to create into two ASCII files. The first file, the POINT FILE, contains the coordinates of important points in the figure. The second file, the LINE FILE, specifies which points are to be connected by lines.

Using disk input mode is like designing a "connect-the-dots" picture.

The point file tells where the dots are to be placed. The line file tells how to connect them.

POINT FILE FORMAT

The point file contains the coordinates of important points in the figure you want to create. Each line of text in the point file (except for comment lines) contains the coordinates of one point.

In 1D or 2D mode, each line of text specifies an X-coordinate and a Y-coordinate. In 3D mode, each line of text specifies an X-coordinate, a Y-coordinate, and a Z-coordinate. Coordinates must be separated by at least one blank, comma, or tab character.

You can include comments in point files. If a semicolon ";" appears in a line of text, the text to the right of the semicolon is treated as a comment by WAVEMAKER. If a line of text begins with a semicolon, the entire line is treated as a comment.

LINE FILE FORMAT

The line file specifies which points in the point file are to be connected by line segments. Each line of text in the line file (except for comment lines) specifies one line segment.

You specify a line segment by its two endpoints, and the line is drawn from the first endpoint to the second endpoint. All endpoints come from the point file, and they are referenced by their position in that file. (The first is point 1, the second is point 2, and so on.) For example, if "3, 5" is a line of text in a line file, it means that WAVEMAKER should draw a line from point number 3 in the point file to point number 5 in the point file.

If you want, you can specify that one or both endpoints be omitted from a line segment. You might want to omit endpoints sometimes for the purpose of eliminating bright spots in a figure at points where several lines join.

To omit an endpoint from a line segment, you include a third number, an endpoint flag, on the line of text describing the line segment. Valid values for endpoint flags are:

- 0 - include both endpoints
- 1 - omit 1st endpoint, include 2nd
- 2 - omit 2nd endpoint, include 1st
- 3 - omit both endpoints

If no endpoint flag is used, a value of 0 is presumed.

Consecutive numbers in a line of text must be separated by at least one blank, comma, or tab character.

You can also include comments in line files. The procedure is the same as for point files.

WATCH FOR OVERFLOW AND UNDERFLOW

WAVEMAKER checks point files and line files for syntax errors but does not check for overflow or underflow -- that is, for numbers that are too large or too small in absolute value. Do not use numbers outside the permissible range, or you will get unpredictable results.

Integers in line files must range from -32768 to +32767 inclusive.

Non-zero real numbers in point files must have an absolute value between $8.7\text{E}-78$ and $7.2\text{E}+75$ inclusive.

SUMMARY OF ERROR MESSAGES

Below is a list of the error messages that WAVEMAKER can return, with an explanation for each message.

TOO MANY POINTS

Your figure contains more points than WAVEMAKER can handle. Reduce the number of points.

SYNTAX ERROR

The line of text shown contains a syntax error.

TOO MANY LINES

Your figure requires more line segments that WAVEMAKER can handle. Reduce the number of line segments.

INVALID POINT NUMBER

The line of text shown contains a point number that is negative, zero, or greater than the number of points in your point file.

INVALID ENDPOINT FLAG

The line of text shown contains an endpoint flag that is less than 0 or greater than 3.

INVALID CHARACTER IN NUMBER

The line of text shown contains an invalid character in a number. For integers, valid characters are digits, "+", and "-". For real numbers, valid characters are digits, "+", "-", ".", and "E".

For other error messages, refer to Data General's "RDOS/DOS Command Line Interpreter User's Manual."

MAKING WIREFRAME FIGURES

This section describes how to construct a 3D wireframe figure on System IV once you've made 3 waveforms for this purpose. You will need 3 function generators to do this.

The method is to shrink the raster to a dot, then apply 3 independent functions to control the sweep of the scan beam in the X, Y, and Z directions. The scan beam traces the entire wireframe figure once per video frame.

Suppose that your waveforms are DEMO1.WF, DEMO2.WF, and DEMO3.WF. Suppose that you use FG1, FG2, and FG3 to build the figure.

1. Set FG1 to DEMO1.WF.
Set FG2 to DEMO2.WF.
Set FG3 to DEMO3.WF.
Set FG1, FG2, FG3 to .LOW_FREQ_SEC.
2. Route FG1 to horizontal.
Route FG2 to vertical.
Route FG3 to depth.
3. Set .HORIZ_FG_AMP, .VERT_FG_AMP, .DEPTH_FG_AMP.
.AMP_1, .AMP_2, .AMP_3 to 2047.
4. Set .HEIGHT, .WIDTH to 0.
5. Set .FREQ_1, .FREQ_2, .FREQ_3 to 1 cycle.
With one section, the value is approximately 1868.
6. You will probably need to turn up .INTENS and to open the scan converter lens.

If you examine a wireframe figure at close range, you will notice that it is made up of many small dots. The dots occur because of the digital nature of System IV waveforms. Each waveform is composed of 1024 discrete sample values, and each sample value produces one dot.

To make the dots less pronounced, multiply the function generator frequencies by an integer. For example, if you multiply by 5, then the scan beam traces out the wireframe figure five times each video frame. This helps blend dots together, but at the cost of some loss of accuracy in tracing the figure.

To construct a 2D wireframe figure, you need only 2 waveforms and 2 function generators. Follow the directions above, ignoring the parts about FG3 and depth.

MAKING STREAKS (OR EXTRUDERS)

This section describes how to construct a streak (or extruder) once you've made 2 waveforms for this purpose. The waveforms define the shape of the streak's cross-section. You will need 2 function generators to set up the figure.

Making a streak is similar to making a cylinder with straight raster lines. The difference is that special waveforms replace the sine and cosine waves used to wrap the raster lines around in a circle.

Suppose that your waveforms are DEMO1.WF and DEMO2.WF.
Suppose that you use FG1 and FG3 to build the figure.

1. Set FG1 to DEMO1.WF.
Set FG3 to DEMO2.WF.
Set FG1 and FG3 to .LOW_FREQ_SEC.
2. Route FG1 to depth.
Route FG3 to vertical.
3. Set .VERT_FG_AMP, .DEPTH_FG_AMP, .AMP_1, .AMP_3 to 2047.
4. Set .HEIGHT to 0.
5. Set .FREQ_1 and .FREQ_3 for 1 cycle.
With one section, the value is approximately 1848.
8. Set .SEL_INTENS_CP to 3.
9. Set .INCLNT and .ROTATE to 2048.
This rotates the streak 90 degrees on a vertical axis so that you can see its cross-section.

MAKING SOLIDS OF REVOLUTION

This section describes how to construct a solid of revolution once you've made 2 waveforms for this purpose. The waveforms define the symmetrical outline or "envelope" of the solid. You will need 4 function generators to set up the figure.

Making a solid of revolution is similar to making a sphere with latitudinal raster lines. The difference is that special waveforms replace the sine and cosine waves used to form the semicircular envelope of a sphere.

When you make your waveforms, use fixed-origin scaling, with the origin on the axis of revolution near the middle of the figure. The directions below assume that the axis of revolution is placed vertically on the graphics tablet.

Suppose that your waveforms are DEMO1.WF and DEMO2.WF.
Suppose that you want to use FG1, FG2, FG3, and FG4.

1. Set FG1 to SIN.WF.
Set FG3 to SIN.WF.
Set FG1 and FG3 to .HI_FREQ_HORZ.
2. Set FG2 to DEMO1.WF.
Set FG4 to DEMO2.WF.
Set FG2 and FG4 to .LOW_FREQ_SEC.
3. Route FG1 x FG2 to horizontal.
Route FG2 x FG3 to depth.
Route FG4 to vertical.
Route FG2 to intensity.
4. Set .HORIZ_FG_AMP, .VERT_FG_AMP, .DEPTH_FG_AMP,
.INTENS_FG_AMP, .FG1_XFG2_AMP, .FG2X3_3X4_AMP,
.AMP_1, .AMP_2, .AMP_3, .AMP_4 to 2047.
5. Set .HEIGHT, .WIDTH to 0.
6. Set .FREQ_1 and .FREQ_3 for 1 cycle.
With one section, the value is approximately 8288.
7. Offset .PHASE_3 by 90 degrees.
The correct value is approximately 260.
8. Set .FREQ_2 and .FREQ_4 for 1 cycle.
With one section, the value is approximately 1868.
9. Set .SEL_INTENS_CP at 4.

MAKING FIGURES WITH COMMAND FILES

You can use command files to make wireframe figures, streaks, and solids of revolution. The command files are:

WIRE123.CF	makes wireframe figure using FG1, FG2, FG3 (requires 3 special waveforms for 3D, 2 for 2D)
WIRE456.CF	makes wireframe figure using FG4, FG5, FG6 (requires 3 special waveforms for 3D, 2 for 2D)
STREAK.CF	makes streak using FG1, FG3 (requires 2 special waveforms)
SOLIDREV.CF	makes solid of revolution using FG1, FG2, FG3, FG4 (requires 2 special waveforms)

These command files adhere to the convention that each special waveform is loaded as .WFM_1 for its respective function generator. You can load your waveforms this way if your System IV software is Revision 3.10 or later. (Revision 3.10 supports the use of 24 different waveforms, 4 per function generator.) Else, you will need to change some waveform assignments after you execute one of these command files.

:"
:" SAMPLE POINT FILE FOR MAKING A 3D WIREFRAME CUBE
:"

1.0,	1.0,	1.0	POINT 1 -- UPPER RIGHT CORNER, TOP FACE
-1.0,	1.0,	1.0	POINT 2 -- UPPER LEFT CORNER, TOP FACE
-1.0,	-1.0,	1.0	POINT 3 -- LOWER LEFT CORNER, TOP FACE
1.0,	-1.0,	1.0	POINT 4 -- LOWER RIGHT CORNER, TOP FACE
1.0,	1.0,	-1.0	POINT 5 -- UPPER RIGHT CORNER, BOTTOM FACE
-1.0,	1.0,	-1.0	POINT 6 -- UPPER LEFT CORNER, BOTTOM FACE
-1.0,	-1.0,	-1.0	POINT 7 -- LOWER LEFT CORNER, BOTTOM FACE
1.0,	-1.0,	-1.0	POINT 8 -- LOWER RIGHT CORNER, BOTTOM FACE

:"
:" SAMPLE LINE FILE FOR MAKING A 3D WIREFRAME CUBE
:"

1. 2

2. 3

3. 4

4. 1

:" TOP FACE LINES (THESE FORM A SQUARE)

5. 6

6. 7

7. 8

8. 5

:" BOTTOM FACE LINES (THESE FORM A SQUARE)

1. 5

2. 6

3. 7

4. 8

:" LINES CONNECTING TOP & BOTTOM FACES
:" (THESE LINES ARE PARALLEL)

WIREFRAME FIGURES

This section describes the setup for making a 3D wireframe figure from a section of raster. You will need 3 function generators and 3 waveforms to do this.

Suppose that your waveforms are named DEMO1.WF, DEMO2.WF, and DEMO3.WF and that you decide to use FG1, FG2, and FG3 to make the figure.

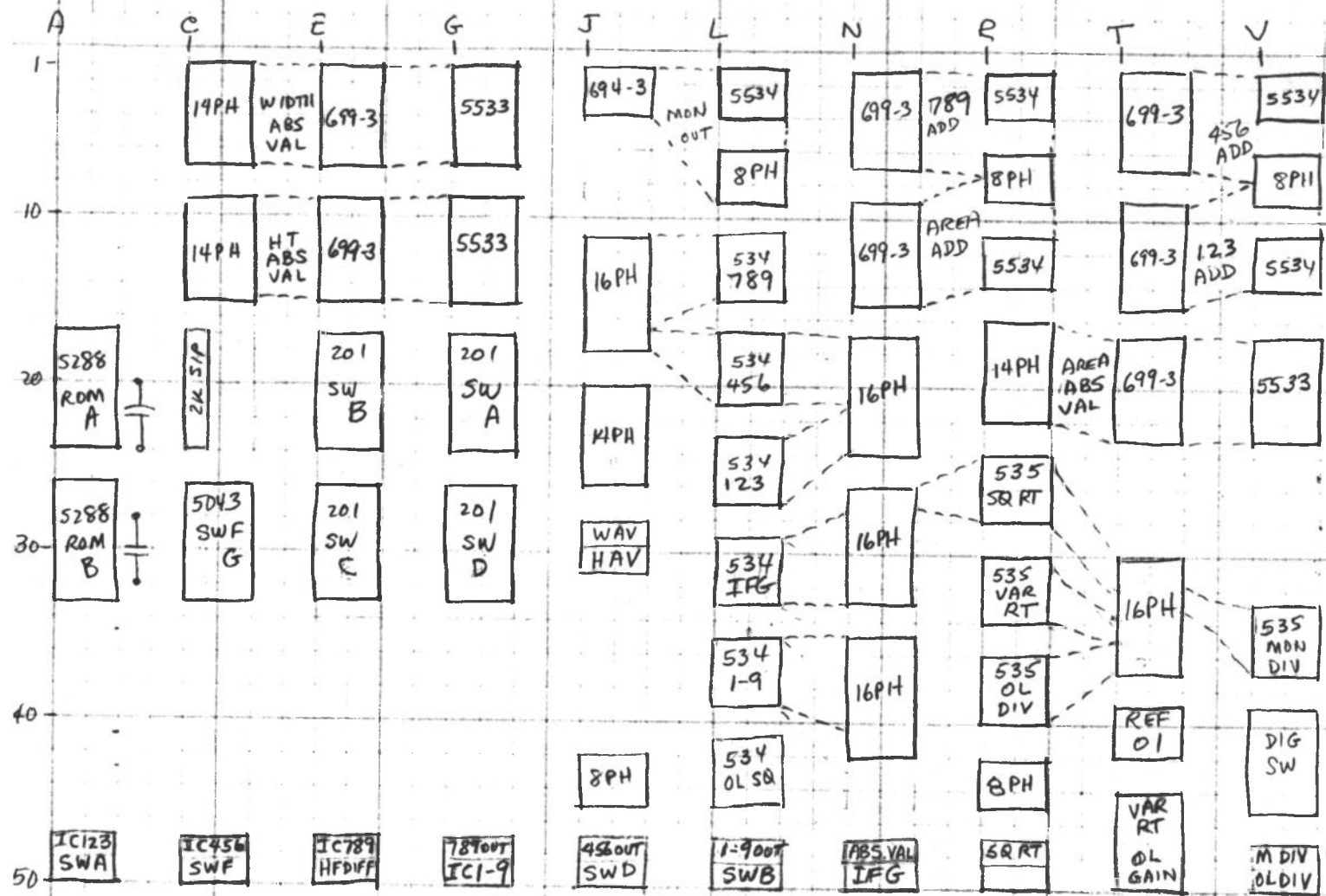
Use DEMO1.WF for FG1, DEMO2.WF for FG2, and DEMO3.WF for FG3. Route FG1 to horizontal, FG2 to vertical, and FG3 to depth. Of course, you can interchange the waveform assignments and/or routes of function generators if you want. This will have the effect of rotating the wireframe figure into different axis positions.

Take the raster to a dot by setting .HEIGHT and .WIDTH at 0. Set up the function generators to reproduce one cycle of their respective waveforms. The function generator frequencies should be equal. All amplitudes should be full. Phases should be 0.

If your System IV software is revision 3.10, you can use the command file WIRE123.CF to set up the wireframe figure described above. A similar command file, WIRE456.CF, performs the same function using FG4, FG5, and FG6. The command files expect each waveform to be loaded as .WFM_1 for its respective function generator. The commands in WIRE123.CF are listed below.

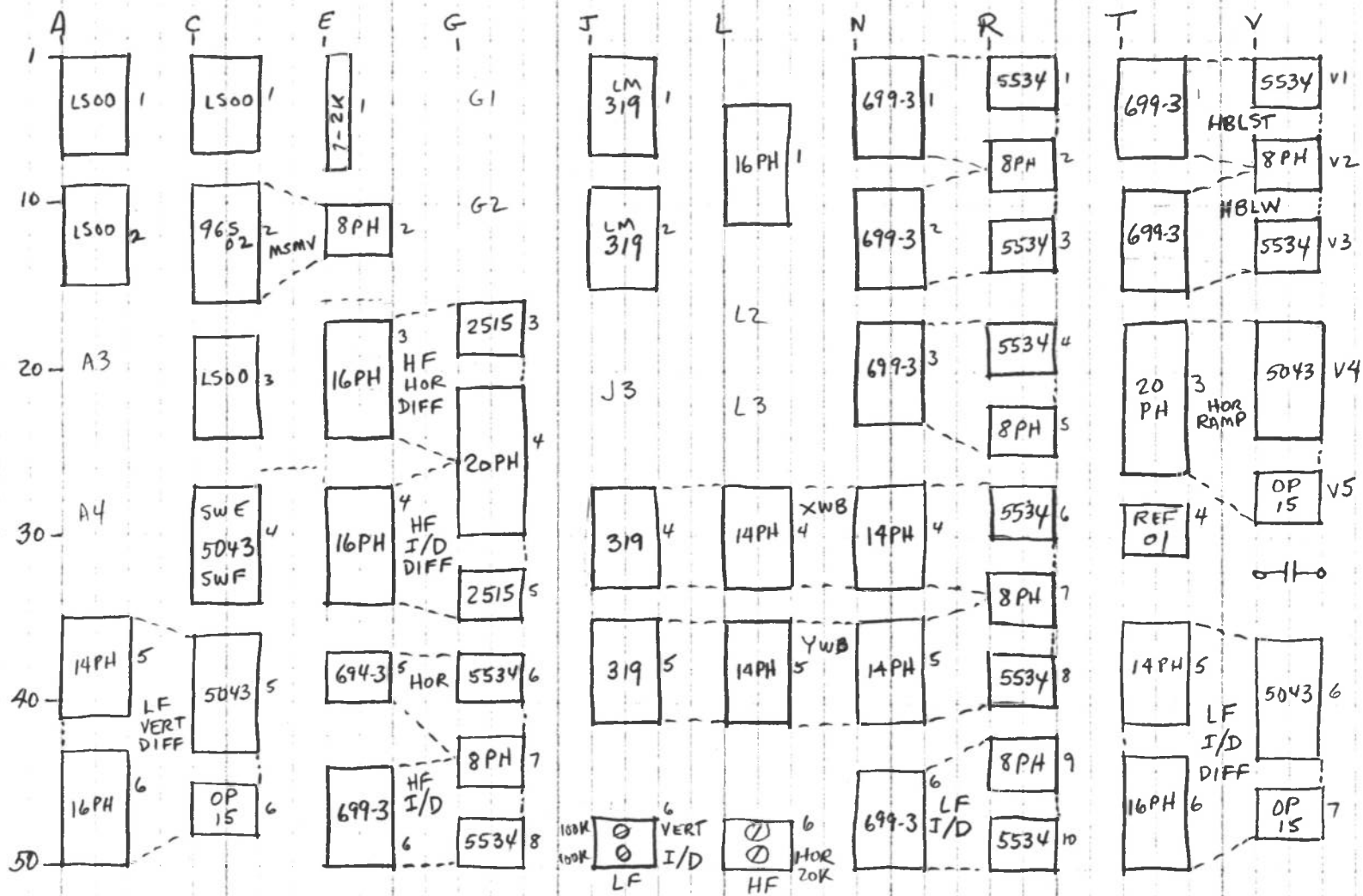
```
.SELECT_NODE S1
.SET_DEFAULT S1 ALL
.SET_VALUE S1 .HORIZ_FG_AMP .VERT_FG_AMP .DEPTH_FG_AMP 2047
.SET_VALUE S1 .AMP_1 .AMP_2 .AMP_3 2047
.SET_VALUE S1 .FREQ_1 .FREQ_2 .FREQ_3 1868
.SET_FG_1 .LOW_FREQ_SEC .WFM_1
.SET_FG_2 .LOW_FREQ_SEC .WFM_1
.SET_FG_3 .LOW_FREQ_SEC .WFM_1
.SEL_HORIZ_FG .FG_1
.SEL_VERT_FG .FG_2
.SEL_DEPTH_FG .FG_3
.SET_VALUE S1 .WIDTH .HEIGHT 0
```

A close examination of the finished wireframe figure will reveal that it is composed of tiny dots, one dot for each sample value in a waveform.



026-4

INTENSITY COMP. CIC-W-20C



CIC-W-23
HOR. BLKG

072, 026-1, 026-4

CATALOG OF SYSTEM IV COMMAND FILES

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- BLANKING.CF** Contains a list of blanking parameters. Useful when activating/deactivating parameters and moving parameters.
Example: `.DEACT_PARAM (S1-S3)(<BLANKING.CF>)`
- CHARACTER.CF** Contains a list of commonly used character animation parameters. Useful when activating parameters.
Example: `.ACT_PARAM (S1-S3)(<CHARACTER.CF>)`
- CYLINDER1.CF** Makes S1 into a cylinder with straight raster lines in animate mode. If there's more than 1 section, adjust FG1 and FG3 frequencies.
Example: `<CYLINDER1.CF>`
- CYLINDER2.CF** Makes S1 into a cylinder with circular raster lines in animate mode. If there's more than 1 section, adjust FG1 and FG3 frequencies.
Example: `<CYLINDER2.CF>`
- FG1.CF**
FG12.CF
FG123.CF
FG1234.CF
FG12345.CF
FG123456.CF
FG2.CF
FG3.CF
FG4.CF
FG5.CF
FG6.CF
- The FG command files contain lists of function generator parameters. For example, FG123.CF contains all the function generator parameters for function generators 1, 2, and 3. Useful when activating/deactivating parameters and moving parameters. (Note: these command files don't contain any routing parameters or overall route amplitudes. Do the routes separately.)
Example: `.MOVE_PARAM S1 <FG123.CF> 1 S2 <FG123.CF> 1`
(moves S1 function generator 1,2,3 parameters in keyframe 1 to same S2 parameters in keyframe 1)
- GEOMETRY.CF** Contains a list of geometric parameters. Useful when activating/deactivating parameters and moving parameters.
Example: `.ACT_PARAM (S1-S3)(<GEOMETRY.CF>)`
- SPHERE1.CF** Makes S1 into a sphere with latitudinal raster lines in animate mode. If there's more than 1 section, adjust FG2 and FG4 frequencies.
Example: `<SPHERE1.CF>`
- SPHERE2.CF** Makes S1 into a sphere with longitudinal raster lines in animate mode. If there's more than 1 section, adjust FG1 and FG3 frequencies.
Example: `<SPHERE2.CF>`
- STARFIELD1.CF** Makes S1 into a starfield in animate mode. Must load NOISE.WF as WF4. To vary the density of the stars, adjust FG1 and FG2 frequencies. If there's more than 1 section, adjust FG3 frequency.
Example: `<STARFIELD1.CF>`

TORUS1.CF Makes S1 into a torus with small circular raster lines in animate mode. If there's more than 1 section, adjust FG1 and FG3 frequencies.
Example: <TORUS1.CF>

TORUS2.CF Makes S1 into a torus with large circular raster lines in animate mode. If there's more than 1 section, adjust FG2 and FG4 frequencies.
Example: <TORUS2.CF>

=====

The following command files use waveforms made with the graphics tablet:

SOLIDREV.CF Makes S1 into a solid of revolution in animate mode, using the envelope formed by two custom waveforms. The waveforms should be loaded into FG2, WF1 and FG4, WF1. If there's more than 1 section, adjust FG2 and FG4 frequencies.
Example: <SOLIDREV.CF>

STREAK.CF Makes S1 into a streak (or extruder) in animate mode, with a cross-section formed by two custom waveforms. The waveforms should be loaded into FG1, WF1 and FG3, WF1. If there's more than 1 section, adjust FG1 and FG3 frequencies.
Example: <STREAK.CF>

VIEWWF.CF Allows you to view the actual shape of a waveform function in animate mode. Use 1 section and load the waveform as WF1.
Example: <VIEWWF.CF>

WIRE123.CF Makes S1 into a 3D wireframe figure formed by three custom waveforms. Uses FG1, FG2, and FG3. The waveforms should be loaded into FG1, WF1 and FG2, WF1 and FG3, WF1. If there's more than 1 section, adjust FG1, FG2, FG3 frequencies.
Example: <WIRE123.CF>

WIRE456.CF Makes S1 into a 3D wireframe figure formed by three custom waveforms. Uses FG4, FG5, and FG6. The waveforms should be loaded into FG4, WF1 and FG5, WF1 and FG6, WF1. If there's more than 1 section, adjust FG4, FG5, FG6 frequencies.
Example: <WIRE456.CF>

03 ; COMMON DATA BLOCK FOR SYSTEM DEFINITIONS.
 04 ;

05 ; SUBROUTINE CDBSD
 06 ;

07 ;
 08 ; DEFINE THE FLAG USED TO DETERMINE REMOTE PROTOCOL.

09 ;
 10 ; INTEGER PCNL ; REMOTE PROTOCOL FLAG
 11 ; COMMON /ZPCNL/ PCNL ; 1 = PROTOCOL 1
 12 ; DATA PCNL / 1 / ; 2 = PROTOCOL 2

13 ;
 14 ; DEFINE THE FLAG USED TO DETERMINE TYPE OF LINE PRINTER.

15 ;
 16 ; INTEGER LPFG ; LINE PRINTER FLAG
 17 ; COMMON /ZLPFG/ LPFG ; 1 = EPSON MX-80
 18 ; DATA LPFG / 1 / ; 2 = DATA GENERAL Dasher LP-2

19 ;
 20 ; DEFINE THE FLAG USED TO DETERMINE WHETHER THE SYSTEM IS NTSC OR PAL.

21 ;
 22 ; INTEGER VFFG ; VIDEO FORMAT FLAG
 23 ; COMMON /ZVFFG/ VFFG ; 1 = NTSC
 24 ; DATA VFFG / 1 / ; 2 = PAL

25 ;
 26 ; CALL DUMMY
 27 ; END

SECT

10 DISPLAYS CONTENTS OF ϕ either 1 or 2
 TYPE IN NEW VALUE

-5 = CUT PIN 7;
WIRE CONV TO PIN 8

SEE DRAWINGS FOR GENERAL
ETCH CUT & JUMPERS

TYPE	COMPONENT CHANGES	JUMPERS
-1 12 bit HF MDAC	NONE	Circuits 30 02 1 to 4 40 01 Non Component side CUT PIN 7; WIRE CONV TO PINS
-2-5 12 bit DAC	OMIT: U10, 20, 30, 40 ✓ U17, 27, 37, 47 ✓ C15, 25, 35, 45 ✓ C18, 28, 38, 48 ✓ C19, 29, 39, 49 ✓ R16, 26, 36, 46 ✓ R17, 27, 37, 47 ✓ CHANGE: R12, 22, 32, 42 to 5.23K ✓ R14, 24, 34, 44 to 7.15K ✓	Circuits 39 02 1 to 4 40 01 Non Component side U17, 27, 37 + 47 Component side ✓ Connect pin 1 to pin 2 DON'T CUT PIN 7
-3 Circuits 1-12 12 bit HF MDAC Circuits 1-12 12 bit DAC BINARY CODE	OMIT: U30, 40 SAME AS -2 U37, 47 C35, 45 C38, 48 C39, 49 R36, 46 R37, 47 CHANGE: R32, 42 to 5.23K R34, 44 to 7.15K 5.23K C14, 24 34, 44 10.01uF	Circuits 30 02 Circuits 1-12 1 to 4 40 01 10K 1% Non Component side Circuits 31-4 39 02 40 01 Non Component side CUT PIN 7 U 37, 47, 17, 27, 37, 47 Connect pin 1 to pin 2 Component side Data Inputs +5 Pin 21 20 19 18 17 16 15 14 13 12 11 10 Cut Dotted Etch Component side
-4 8 bit HF MDAC	NONE	Circuits 30 02 1 to 4 40 01 Non Component side Data Inputs 21 20 19 18 17 16 15 14 13 12 11 10 CUT PIN 7; WIRE CONV TO PIN 8 Cut Dotted Etch Component side

QTY PER SYS	TYPE	COMPONENT CHANGES	JUMPERS
8	-1 12 BIT HF MDAC	NONE	CIRC. 1-4 BACK SIDE Cut pin 7 Wire CONV to pin 8
4	-2 12 BIT DAC 02 LF MDAC	OMIT U10,20,30,40 U17,27,37,47 C18,28,38,48 C19,29,39,49 R16,26,36,46 R17,27,37,47 C15,25,35,45 CHANGE R12,22,32,42 to 5.23K R14,24,34,44 to 7.15K	CIRC. 1-4 BACK SIDE U17,27,37,47: 1 to 2 COM SIDE
1	-3 CIRC 1 & 2 11 BIT HF MDAC CIRC 3 & 4 11 BIT DAC	OMIT U30,40 U37,47 C38,48 C39,49 R36,46 R37,47 C35,45 CHANGE R32,42 to 5.23K R34,44 to 7.15K OBS.	CIRC. 1 & 2 BACK SIDE CIRC. 3 & 4 BACK SIDE U37,47: 1 to 2 COM SIDE CUT DOTTED ETCH CUT PIN 7
1	-4 8 BIT HF MDAC	NONE	CIRC. 1-4 BACK SIDE DATA INPUTS: CUT DOTTED ETCH Cut pin 7 Wire CONV to pin 8
15	-5	SAME AS -2	